

NATIONALGEOGRAPHIC.COM/MAGAZINE | JANUARY 2009

# NATIONAL GEOGRAPHIC

# Gold

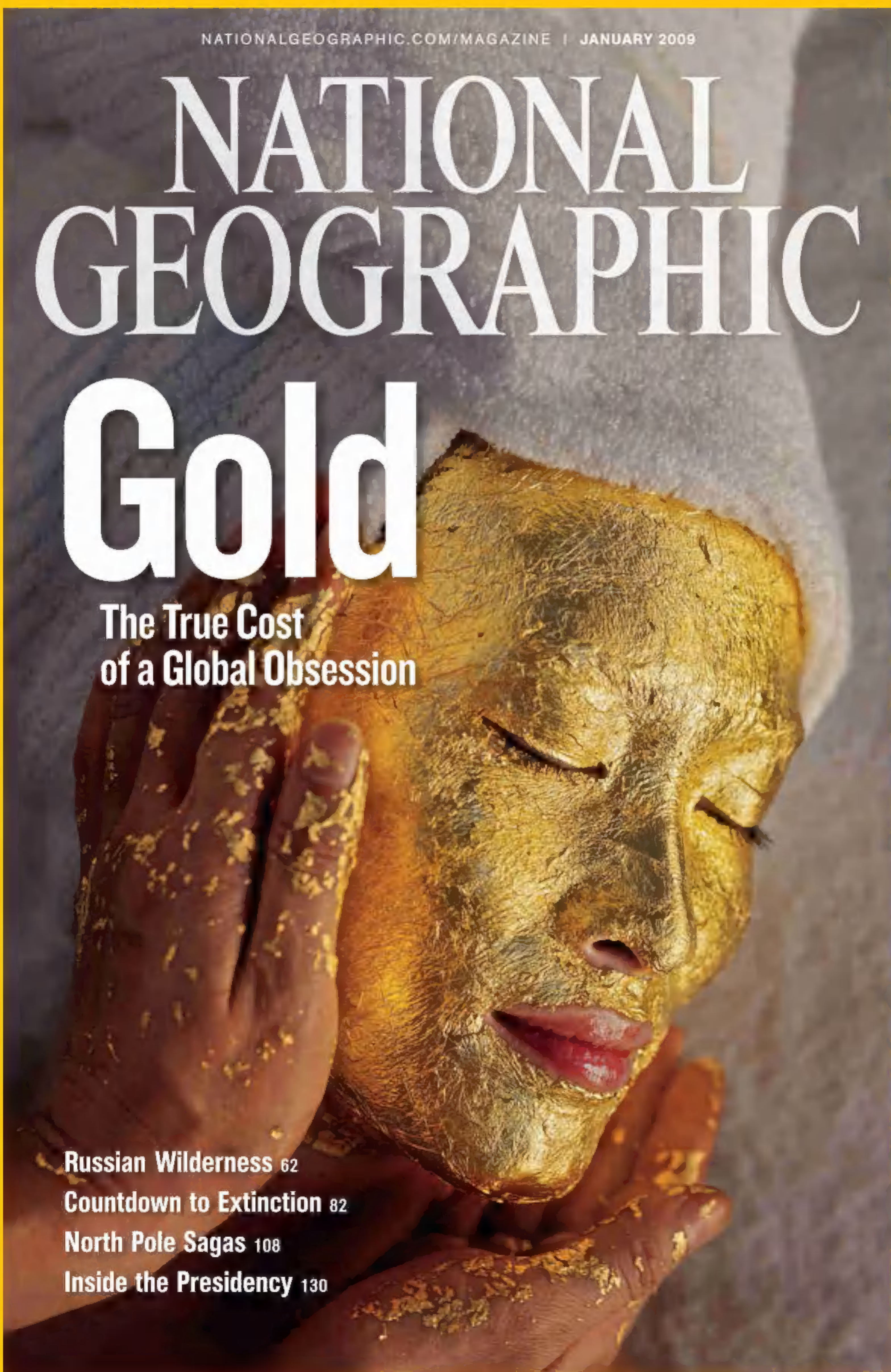
The True Cost  
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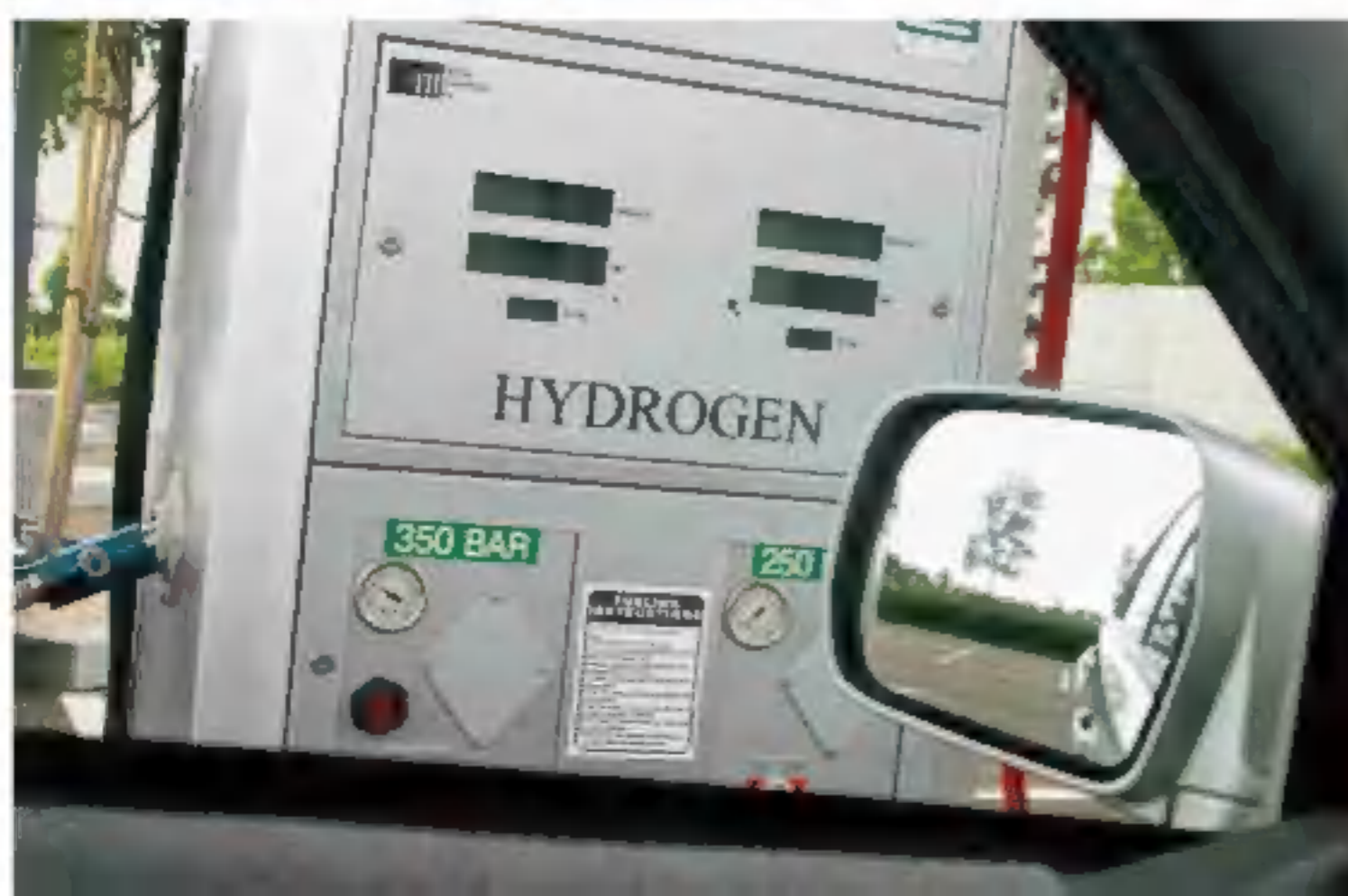
# HYDROGEN? ELECTRICITY? BIOFUEL? POTATOES?

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# NATIONAL GEOGRAPHIC

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ALLIGATOR MISSISSIPPIENSIS  
STORY ON PAGE 82  
PHOTO: JOEL SARTORE;  
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# NATIONAL GEOGRAPHIC

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Photo by Robert Clark

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CHRISTOPHER MORRIS



**Cotton-top Tamarin** (*Saguinus oedipus*)

**Size:** Head and body length, 22.5 - 24 cm (8.9 - 9.4 inches); tail, 33 - 40 cm (13 - 15.7 inches)

**Weight:** 411 - 430 g (14.5 - 15.2 oz) **Habitat:** Endemic to northwestern Colombia; found in rainforest, deciduous forest and secondary forest **Surviving number:** Estimated at 6,000



Photographed by Lisa Hoffner

# WILDLIFE AS CANON SEES IT

Share and share alike. It's a motto cotton-top tamarins embody, as they share much more than a striking white topknot and mane. They share food liberally, especially fathers with offspring and older siblings with younger ones. They divvy up guard duty, with one keeping watch while the others forage. And they work together in defending their turf with vocal and physical displays; males fluff up their hair menacingly, approach invaders

and attack, while females scent-mark territory. But these cooperative creatures also share the perils of habitat loss and capture for the pet trade, which are taking a heavy toll on populations.

As we see it, we can help make the world a better place. Raising awareness of endangered species is just one of the ways we at Canon are taking action—for the good of the planet we call home. Visit [ngm.com/canonwildlife](http://ngm.com/canonwildlife) to learn more.



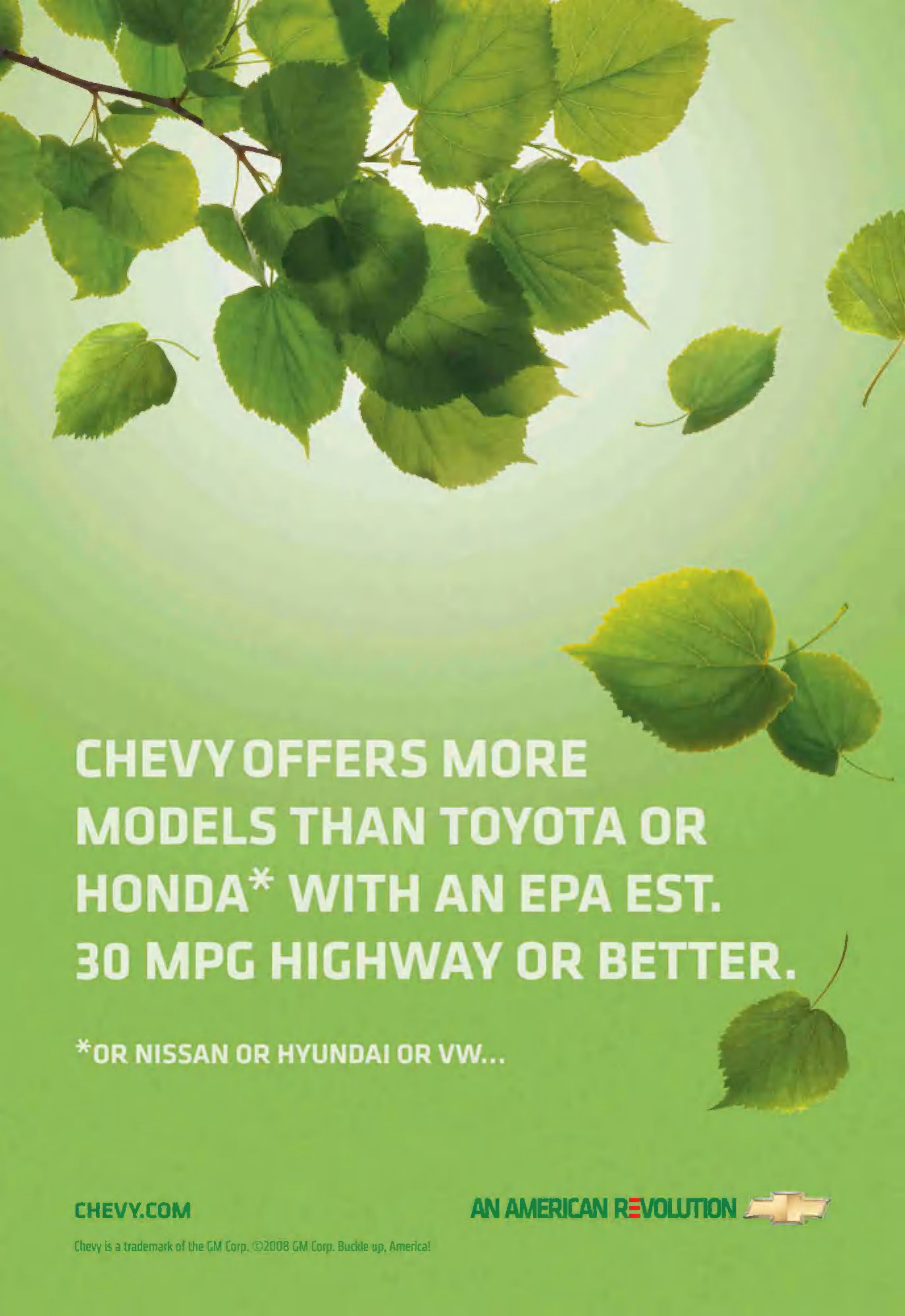
Joel and Kathy Sartore have been married for 23 years.

**The day before Thanksgiving** in 2005, Kathy Sartore, married to photographer Joel Sartore, learned she had breast cancer. “Cancer is a thief. It steals time,” Joel says. “But cancer can also be a blessing, an amazing experience that forces us to set things right. My work had made me a stranger to my three kids. With Kathy sick, I knew it was time to stay put for a while.” So Joel stayed close to home. He started photographing endangered species in his hometown zoo in Lincoln, Nebraska. Then he took his portable studio down the road to the Omaha Zoo. “My fascination with endangered species started when, as a child, I saw a picture of Martha, the last passenger pigeon,” Joel explains. “She died at the Cincinnati Zoo in 1914. Audubon described flocks flying at 60 miles an hour, darkening the skies for days at a time. And there she was, the last bird. I’ve never forgotten that.”

Kathy has beaten cancer, but Joel’s mission continues. So far, he’s documented more than 1,200 imperiled species. Among his photographs in this month’s story “Last One,” you’ll see a pygmy rabbit named Bryn. She died not long after the picture was made. Now the Columbia Basin pygmy rabbit population is no more. Joel hopes his work will help prevent this from happening to other animals.

Since that monumental day in 2005, Joel has learned how to combine his passion for his family with his passion for photography. “Kathy’s cancer made me realize how little time any of us really has,” he says. Time, our most precious currency, is the most valuable thing we humans can spend.





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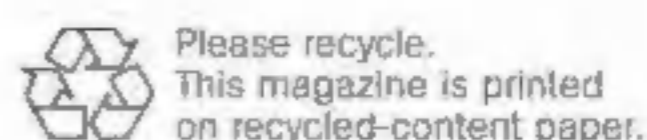
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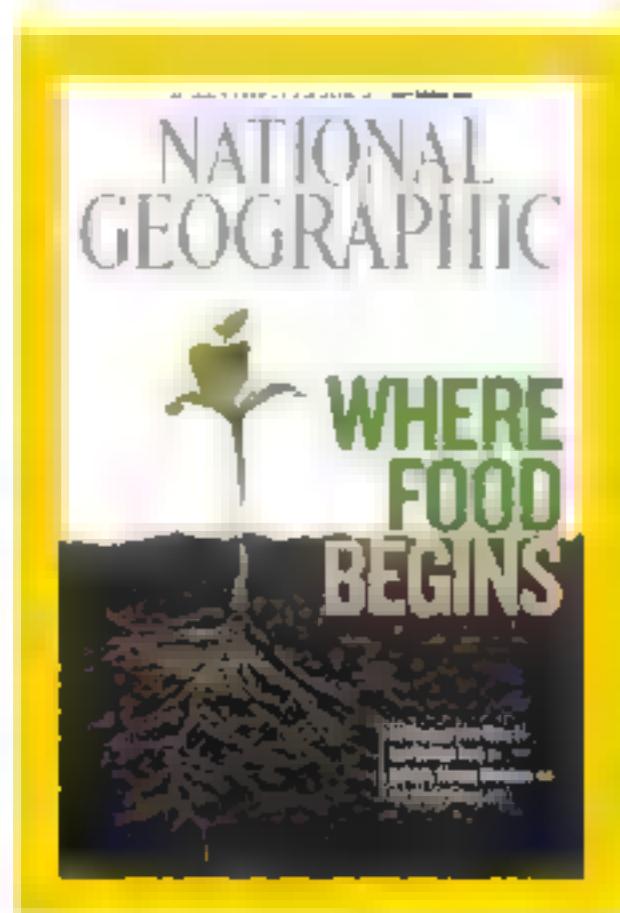
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September 2008

## Our Good Earth

I have just finished reading "Our Good Earth," and as I look out my window, I see earthmoving equipment, the construction of new highways, and new housing developments composed of 3,000-square-foot homes for families of four framed by tiny strips of lawn. It is as if Americans cannot cover up soil fast enough. All the while we moan about the need for more wheat, more corn, more sustainable farming. If we are truly to be part of the global community, it's time to walk our talk. Let's start by cherishing the precious scraps of earth beneath our own feet.

**PETRINA VECCHIO**  
Ashford, Washington

Author Charles C. Mann was quick to criticize practices of farmers around the world that were perceived as depleting the amount and quality of arable land, but never once mentioned the largest contributor to the loss of arable land in the United States: urban sprawl. The quote on page 104 says, "By 2030, 8.3 billion people will walk the Earth, and farmers will have to grow 30 percent more grain." Will we

have to bulldoze subdivisions to do it? I found myself looking for the practices of urbanites as a contributing factor. Homes for people are a legitimate use, but the current practice of using the best land for subdivisions forces farmers to work land that probably never should be cultivated in the first place.

**MARK ZEUG**  
Honolulu, Hawaii

I wonder what any of the tens of thousands displaced during the Dust Bowl years would say to the author, sitting high in a tractor machine that could never be imagined in 1939. Certainly the plundering attitude of agribusiness hasn't changed. Profits continue to be reaped and humanity displaced. My grandchildren will inherit a world sickened from such poor stewardship. It saddens me to think we cannot learn from the mistakes of the past as they are made over and over again.

**KERRY LANDECK**  
Storrs, Connecticut

We could follow the practice of Amazonia's first settlers—adding charcoal to the soil to boost its fertility—as a global warming twofer. This would reduce atmospheric CO<sub>2</sub> and make soils more resilient to variable precipitation. The world's poorest areas could use outside investment in such a project, perhaps with investors earning carbon credits.

**WILL DRISCOLL**  
Arlington, Virginia

We know where food begins, yet we are destroying our soil with poisons and cutting down forests as if they were going out of style. We are exploiting

our oceans and destroying rivers. It does not take a wise man to see that we have learned little. Your complementing articles "Our Good Earth" and "Lost Tribes of the Green Sahara" tell the same sad human story: Thriving settlements were abandoned when they turned into deserts.

**KARL BACKHAUS**  
Holland Centre, Ontario

Desertification, land degradation, and drought are our silent enemies. They undermine the fertility of the land and affect food security, water availability, and environmentally induced migration and conflicts. Global food availability and prices will continue to worsen if sustainable land management and soil protection are not implemented, and if the decrease of arable land is not halted. The United Nations Convention to Combat Desertification, endorsed by 192 countries and the EU, is a unique multilateral instrument that serves as the nexus between poverty reduction and ecosystem protection in the drylands. Its ten-year strategic plan calls for a global partnership to make the world vigilant against these silent enemies.

**LUC GNACADJA**  
Executive Secretary  
United Nations Convention to  
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Bonn, Germany

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## LETTERS

It's hard to believe that I have more than I can ever eat when kids all over the world are going to sleep tonight with empty stomachs. The world food supply has been stretched so far that farmers now have to start changing to correct the mistakes of their grandparents. After reading this article, I feel like we can do something. Scientists and farmers working together can solve the eroding earth problems, from simple techniques like those of Yacouba Sawadogo to more advanced ones being tested in the Brazilian rain forest.

**JERRAD GRIDER**  
Concord, California

Sustainable food security is perhaps the most important issue facing humanity. Our destructive, oil-addicted agricultural practices must be addressed if we are to feed the rising population amidst rapidly rising energy costs. However, I was amazed that your article did not mention organic farming, the only widely used commercial technique that ensures that soils are enriched in a sensible, sustainable way. You mentioned carbon capturing within soil but didn't mention the huge carbon footprint of chemical fertilizers. Organic farming is already working to solve many of the issues raised in the article.

**HENRY GODFREY**  
Bristol, England

The article on soil provided timely and informative insight into the dangerous realities of soil degradation. However, I was disappointed that there was no serious discussion of humanity's startling population growth and the resultant

demands for living space. Yes, more mouths to feed means more farming and land used for agriculture—and more pressure on already pressed soil. But besides stripping out the soil's nutrients to nourish so many human bodies, the need for habitation also means further development of land. Although there are methods for making even urban land fruitful, the replacement of arable soil with concrete ultimately means more lost soil, more pollution, and less food.

**JUSTIN VAN KLEECK**  
Charlottesville, Virginia

I made several trips to Haiti 50 years ago, and the juxtaposition of the beauty of the people and geography against the grinding poverty left a lifelong impression. Even then, extensive soil degradation was in evidence.

The more often land is plowed, the faster it loses vital organic matter and the biotic activity it supports. Already, many farmers grow crops without plowing, on almost 100 million hectares [more than 247 million acres] in countries as diverse as the United States, Paraguay, South Africa, and Australia. They use the residues of previous crops or of specially grown nitrogen-fixing legumes to create a

mulch into which seed and fertilizer are drilled directly with a tractor or planted by a handheld tool. This type of no-till farming is the foundation for a greener revolution.

**AMIR KASSAM**  
Chairman  
Tropical Agriculture Association  
Reading, England

### Haiti: Dirt Poor

I made several trips to Haiti 50 years ago, and the juxtaposition of the beauty of the people and geography against the grinding poverty left a lifelong impression. Even then, extensive soil degradation was in evidence, adding unbearable pressure to the cultivation of what little soil may have been left. One of the prime reasons for soil degradation in Haiti has been deforestation for the production of charcoal. Yet in your article "Our Good Earth" there is hopeful news of long-lasting regeneration by adding crumbled charcoal to soil. Could this work in Haiti? I am convinced that helping the Haitian people to rehabilitate their land is the essential first step in improving their lives.

**REX P. COWAN**  
Winter Haven, Florida

### Corrections, Clarifications

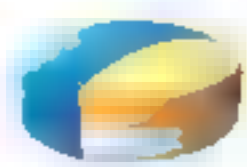
**September 2008:**  
**Our Good Earth** The tree-planting program in Niger described on page 87 should have been attributed to the UN Food and Agriculture Organization. The map on page 92 incorrectly classified the soil of southwestern Alaska as highly fertile.

**Eco-Living** The crop shown in the photo of the Fife, Scotland, farm is ruby chard.

**DID YOU KNOW THERE ARE 2 FORMS OF AMBIEN (ZOLPIDEM TARTRATE)C?  
AND THERE IS AN IMPORTANT DIFFERENCE.**



**AMBIEN CR is the only form of Ambien that is FDA approved to help you fall asleep and stay asleep:**



The first layer dissolves quickly to help you fall asleep fast, while the second dissolves slowly to help you stay asleep.\* So you wake up less frequently and fall back to sleep faster.

For people who have trouble falling asleep and/or staying asleep, only AMBIEN CR has two layers that address both problems: The first layer dissolves quickly to help you fall asleep fast, while the second dissolves slowly to help you stay asleep, so you can wake up ready for your day.\*\* AMBIEN CR can be taken for as long as your healthcare provider recommends. Ask your prescriber if AMBIEN CR is right for you.

**There is no generic form of AMBIEN CR, so ask your prescriber or pharmacist for AMBIEN CR by name.**

\* Proven effective for up to 7 hours in clinical studies.

\*\* Individual results may vary.

**For special offers and a 7-Night free trial of AMBIEN CR visit: [CRFree7Day.com](http://CRFree7Day.com) or call 1.877.665.9351.**

AMBIEN CR is indicated to help you fall asleep and/or stay asleep.

**IMPORTANT SAFETY INFORMATION**

AMBIEN CR is a treatment option you and your doctor can consider along with lifestyle changes and can be taken for as long as your doctor recommends. Until you know how AMBIEN CR will affect you, you shouldn't drive or operate machinery. Be sure you're able to devote 7 to 8 hours to sleep before being active again. Sleepwalking, and eating or driving while not fully awake, with amnesia for the event have been reported. If you experience any of these behaviors contact your provider immediately. In rare cases sleep aids may cause allergic reactions such as swelling of your tongue or throat or shortness of breath or more severe results. If you have an allergic reaction while using AMBIEN CR, contact your doctor immediately. Side effects may include next-day drowsiness, dizziness and headache. It's non-narcotic; however, like

most sleep medicines it has some risk of dependency. Don't take it with alcohol.

AMBIEN is indicated for short-term treatment to help you fall asleep.

**IMPORTANT SAFETY INFORMATION**

When you first start taking AMBIEN, use caution in the morning when engaging in activities requiring complete alertness until you know how you will react to this medication. In most instances, memory problems can be avoided if you take AMBIEN only when you are able to get a full night's sleep (7 to 8 hours) before you need to be active again. As with any sleep medication, do not use alcohol while you are taking AMBIEN. Sleepwalking, and eating or driving while not fully awake, with amnesia for the event, have been reported. If you experience any of these behaviors contact your provider immediately. In rare cases, sleep medicines may cause allergic reactions such as swelling of your tongue or throat, shortness of breath or more severe results. If you have an allergic

reaction while using AMBIEN, contact your doctor immediately. Prescription sleep aids are often taken for 7 to 10 days – or longer as advised by your provider. Like most sleep medicines, it has some risk of dependency. There is a low occurrence of side effects associated with the short-term use of AMBIEN. The most commonly observed side effects in controlled clinical trials were drowsiness (2%), dizziness (1%), and diarrhea (1%).

You are encouraged to report negative side effects of prescription drugs to the FDA. Visit [www.fda.gov/medwatch](http://www.fda.gov/medwatch) or 1-800-FDA-1088



**A GOOD NIGHT'S SLEEP FROM START TO FINISH.**

## MEDICATION GUIDE

### **AMBIEN CR®** (ām'bē-ən see ahr) **C-IV** (zolpidem tartrate extended-release tablets)

Read the Medication Guide that comes with AMBIEN CR before you start taking it and each time you get a refill. There may be new information. This Medication Guide does not take the place of talking to your doctor about your medical condition or treatment.

#### **What is the most important information I should know about AMBIEN CR?**

**After taking AMBIEN CR, you may get up out of bed while not being fully awake and do an activity that you do not know you are doing. The next morning, you may not remember that you did anything during the night.** You have a higher chance for doing these activities if you drink alcohol or take other medicines that make you sleepy with AMBIEN CR. Reported activities include:

- driving a car (“sleep-driving”)
- making and eating food
- talking on the phone
- having sex
- sleep-walking

**Call your doctor right away if you find out that you have done any of the above activities after taking AMBIEN CR.**

#### **Important:**

##### **1. Take AMBIEN CR exactly as prescribed**

- Do not take more AMBIEN CR than prescribed.
- Take AMBIEN CR right before you get in bed, not sooner.

##### **2. Do not take AMBIEN CR if you:**

- drink alcohol
- take other medicines that can make you sleepy. Talk to your doctor about all of your medicines. Your doctor will tell you if you can take AMBIEN CR with your other medicines.
- cannot get a full night’s sleep

#### **What is AMBIEN CR?**

AMBIEN CR is a sedative-hypnotic (sleep) medicine. AMBIEN CR is used in adults for the treatment of a sleep problem called insomnia. Symptoms of insomnia include:

- trouble falling asleep
- waking up often during the night

AMBIEN CR is not for children.

AMBIEN CR is a federally controlled substance (C-IV) because it can be abused or lead to dependence. Keep AMBIEN CR in a safe place to prevent misuse and abuse. Selling or giving away AMBIEN CR may harm others, and is against the law. Tell your doctor if you have ever abused or have been dependent on alcohol, prescription medicines or street drugs.

#### **Who should not take AMBIEN CR?**

Do not take AMBIEN CR if you are allergic to anything in it. See the end of this Medication Guide for a complete list of ingredients in AMBIEN CR.

**AMBIEN CR may not be right for you. Before starting AMBIEN CR, tell your doctor about all of your health conditions, including if you:**

- have a history of depression, mental illness, or suicidal thoughts
- have a history of drug or alcohol abuse or addiction
- have kidney or liver disease
- have a lung disease or breathing problems
- are pregnant, planning to become pregnant, or breastfeeding

Tell your doctor about all of the medicines you take including prescription and nonprescription medicines, vitamins and herbal supplements. Medicines can interact with each other, sometimes causing serious side effects. **Do not take AMBIEN CR with other medicines that can make you sleepy.**

Know the medicines you take. Keep a list of your medicines with you to show your doctor and pharmacist each time you get a new medicine.

#### **How should I take AMBIEN CR?**

- Take AMBIEN CR exactly as prescribed. Do not take more AMBIEN CR than prescribed for you.
- **Take AMBIEN CR right before you get into bed.**
- **Do not take AMBIEN CR unless you are able to stay in bed a full night (7-8 hours) before you must be active again.**
- Swallow AMBIEN CR Tablets whole. Do not chew or break the tablets. Tell your doctor if you cannot swallow tablets whole.
- For faster sleep onset, AMBIEN CR should NOT be taken with or immediately after a meal.
- Call your doctor if your insomnia worsens or is not better within 7 to 10 days. This may mean that there is another condition causing your sleep problems.
- If you take too much AMBIEN CR or overdose, call your doctor or poison control center right away, or get emergency treatment.

#### **What are the possible side effects of AMBIEN CR?**

##### **Serious side effects of AMBIEN CR include:**

- **getting out of bed while not being fully awake and do an activity that you do not know you are doing.** (See “What is the most important information I should know about AMBIEN CR?”)
- **abnormal thoughts and behavior.** Symptoms include more outgoing or aggressive behavior than normal, confusion, agitation, hallucinations, worsening of depression, and suicidal thoughts or actions.
- **memory loss**
- **anxiety**
- **severe allergic reactions.** Symptoms include swelling of the tongue or throat, trouble breathing, and nausea and vomiting. Get emergency medical help if you get these symptoms after taking AMBIEN CR.



**Call your doctor right away if you have any of the above side effects or any other side effects that worry you while using AMBIEN CR.**

**The most common side effects of AMBIEN CR are:**

- headache
- sleepiness
- dizziness
- You may still feel drowsy the next day after taking AMBIEN CR. **Do not drive or do other dangerous activities after taking AMBIEN CR until you feel fully awake.**

**After you stop taking a sleep medicine,** you may have symptoms for 1 to 2 days such as: trouble sleeping, nausea, flushing, lightheadedness, uncontrolled crying, vomiting, stomach cramps, panic attack, nervousness, and stomach area pain. These are not all the side effects of AMBIEN CR. Ask your doctor or pharmacist for more information.

Call your doctor for medical advice about side effects. You may report side effects to FDA at 1-800-FDA-1088.

**How should I store AMBIEN CR?**

- Store AMBIEN CR at room temperature, 59° to 77°F (15° to 25° C).
- **Keep AMBIEN CR and all medicines out of reach of children.**

**General Information about AMBIEN CR**

- Medicines are sometimes prescribed for purposes other than those listed in a Medication Guide.
- Do not use AMBIEN CR for a condition for which it was not prescribed.

- Do not share AMBIEN CR with other people, even if you think they have the same symptoms that you have. It may harm them and it is against the law.

This Medication Guide summarizes the most important information about AMBIEN CR. If you would like more information, talk with your doctor. You can ask your doctor or pharmacist for information about AMBIEN CR that is written for healthcare professionals. For more information about AMBIEN CR, call 1-800-633-1610 or visit [www.ambienr.com](http://www.ambienr.com).

**What are the ingredients in AMBIEN CR?**

**Active Ingredient:** Zolpidem tartrate

**Inactive Ingredients:** The 6.25 mg tablets contain: colloidal silicon dioxide, hypromellose, lactose monohydrate, magnesium stearate, microcrystalline cellulose, polyethylene glycol, potassium bitartrate, red ferric oxide, sodium starch glycolate, and titanium dioxide. The 12.5 mg tablets contain: colloidal silicon dioxide, FD&C Blue #2, hypromellose, lactose monohydrate, magnesium stearate, microcrystalline cellulose, polyethylene glycol, potassium bitartrate, sodium starch glycolate, titanium dioxide, and yellow ferric oxide.

**Rx Only**

This Medication Guide has been approved by the U.S. Food and Drug Administration.

sanofi-aventis U.S. LLC  
Bridgewater, NJ 08807

January 2008a

AMBCR-JAN08a-M-Ab

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**MEDICATION GUIDE**  
**AMBIEN®** (ām'bē-ən) **Tablets C-IV**  
(zolpidem tartrate)

Read the Medication Guide that comes with AMBIEN before you start taking it and each time you get a refill. There may be new information. This Medication Guide does not take the place of talking to your doctor about your medical condition or treatment.

**What is the most important information I should know about AMBIEN?**

**After taking AMBIEN, you may get up out of bed while not being fully awake and do an activity that you do not know you are doing. The next morning, you may not remember that you did anything during the night.** You have a higher chance for doing these activities if you drink alcohol or take other medicines that make you sleepy with AMBIEN. Reported activities include:

- driving a car ("sleep-driving")
- making and eating food
- talking on the phone
- having sex
- sleep-walking

**Call your doctor right away if you find out that you have done any of the above activities after taking AMBIEN.**

**Important:**

**1. Take AMBIEN exactly as prescribed**

- Do not take more AMBIEN than prescribed.
- Take AMBIEN right before you get in bed, not sooner.

**2. Do not take AMBIEN if you:**

- drink alcohol
- take other medicines that can make you sleepy. Talk to your doctor about all of your medicines. Your doctor will tell you if you can take AMBIEN with your other medicines.
- cannot get a full night's sleep

**What is AMBIEN?**

AMBIEN is a sedative-hypnotic (sleep) medicine. AMBIEN is used in adults for the short-term treatment of a sleep problem called insomnia. Symptoms of insomnia include:

- trouble falling asleep

AMBIEN is not for children.

AMBIEN is a federally controlled substance (C-IV) because it can be abused or lead to dependence. Keep AMBIEN in a safe place to prevent misuse and abuse. Selling or giving away AMBIEN may harm others, and is against the law. Tell your doctor if you have ever abused or have been dependent on alcohol, prescription medicines or street drugs.

### Who should not take AMBIEN?

Do not take AMBIEN if you are allergic to anything in it.

See the end of this Medication Guide for a complete list of ingredients in AMBIEN.

**AMBIEN may not be right for you. Before starting AMBIEN, tell your doctor about all of your health conditions, including if you:**

- have a history of depression, mental illness, or suicidal thoughts
- have a history of drug or alcohol abuse or addiction
- have kidney or liver disease
- have a lung disease or breathing problems
- are pregnant, planning to become pregnant, or breastfeeding

Tell your doctor about all of the medicines you take including prescription and nonprescription medicines, vitamins and herbal supplements. Medicines can interact with each other, sometimes causing serious side effects. **Do not take AMBIEN with other medicines that can make you sleepy.**

Know the medicines you take. Keep a list of your medicines with you to show your doctor and pharmacist each time you get a new medicine.

### How should I take AMBIEN?

- Take AMBIEN exactly as prescribed. Do not take more AMBIEN than prescribed for you.
- **Take AMBIEN right before you get into bed.**
- **Do not take AMBIEN unless you are able to stay in bed a full night (7-8 hours) before you must be active again.**
- For faster sleep onset, AMBIEN should NOT be taken with or immediately after a meal.
- Call your doctor if your insomnia worsens or is not better within 7 to 10 days. This may mean that there is another condition causing your sleep problem.
- If you take too much AMBIEN or overdose, call your doctor or poison control center right away, or get emergency treatment.

### What are the possible side effects of AMBIEN?

**Serious side effects of AMBIEN include:**

- **getting out of bed while not being fully awake and do an activity that you do not know you are doing.** (See “What is the most important information I should know about AMBIEN?”)
- **abnormal thoughts and behavior.** Symptoms include more outgoing or aggressive behavior than normal, confusion, agitation, hallucinations, worsening of depression, and suicidal thoughts or actions.
- **memory loss**
- **anxiety**
- **severe allergic reactions.** Symptoms include swelling of the tongue or throat, trouble breathing, and nausea and vomiting. Get emergency medical help if you get these symptoms after taking AMBIEN.

**Call your doctor right away if you have any of the above side effects or any other side effects that worry you while using AMBIEN.**

**The most common side effects of AMBIEN are:**

- drowsiness
- dizziness
- diarrhea
- “drugged feelings”
- You may still feel drowsy the next day after taking AMBIEN. **Do not drive or do other dangerous activities after taking AMBIEN until you feel fully awake.**

**After you stop taking a sleep medicine,** you may have symptoms for 1 to 2 days such as: trouble sleeping, nausea, flushing, lightheadedness, uncontrolled crying, vomiting, stomach cramps, panic attack, nervousness, and stomach area pain.

These are not all the side effects of AMBIEN. Ask your doctor or pharmacist for more information.

Call your doctor for medical advice about side effects. You may report side effects to FDA at 1-800-FDA-1088.

### How should I store AMBIEN?

- Store AMBIEN at room temperature, 68° to 77°F (20° to 25°C).
- **Keep AMBIEN and all medicines out of reach of children.**

### General Information about AMBIEN

- Medicines are sometimes prescribed for purposes other than those listed in a Medication Guide.
- Do not use AMBIEN for a condition for which it was not prescribed.
- Do not share AMBIEN with other people, even if you think they have the same symptoms that you have. It may harm them and it is against the law.

This Medication Guide summarizes the most important information about AMBIEN. If you would like more information, talk with your doctor. You can ask your doctor or pharmacist for information about AMBIEN that is written for healthcare professionals. For more information about AMBIEN, call 1-800-633-1610.

### What are the ingredients in AMBIEN?

**Active Ingredient:** Zolpidem tartrate

**Inactive Ingredients:** hydroxypropyl methylcellulose, lactose, magnesium stearate, micro-crystalline cellulose, polyethylene glycol, sodium starch glycolate, and titanium dioxide. In addition, the 5 mg tablet contains FD&C Red No. 40, iron oxide colorant, and polysorbate 80.


### Rx Only

This Medication Guide has been approved by the U.S. Food and Drug Administration.

sanofi-aventis U.S. LLC  
Bridgewater, NJ 08807

June 2008

AMB-JUNE08-F-Ac



*In all my years as a GIA graduate, I have never seen such a large carat weight of magnificent raw sapphires at such an outstanding price. The Raw Sapphire Necklace is without a doubt one of the best jewelry offerings I've seen in years.*

— JAMES T. FENT, Stauer GIA Graduate Gemologist

**Raw Sapphire Earrings FREE\*** with the purchase of complete set. See details below.

# Buck Naked Blue Beauties

*Feast your eyes on a colossal 350 carats of raw sapphire.*

For centuries, blue sapphire has been known as the stone of destiny and desire. History's most powerful men have used the gem to woo the world's most desirable women. From King Solomon and Queen of Sheba to Napoleon and Josephine, the seductive powers of sapphire are legendary. Today, the presentation of large blue sapphires is still a grand romantic gesture. Each rare gem pulses with the passion of the ages. But it is most likely that few of these great romances have been privy to anything like a stunning 350 carat necklace of midnight ocean blue sapphires.

**That old blue magic.** Look closely into the ethereal blues and you can see why sapphires are just as desirable today as when the ancient Persians believed that they colored the sky. Thankfully, a trusted gemologist discovered a selection of large beautiful uncut sapphires and we bought his entire find. Each naturally mined blue stone is unique, and has the striking color and hardness that make sapphires famous (scoring a 9 out of 10 on the Mohs scale, the sapphire ranks second only to diamonds as the hardest gem on the planet). After polishing, we realized that the gemstones were perfect as they were... as nature intended.

**Naturally uncut, simply stunning.** There's just something absolutely mesmerizing about a polished, uncut rare gemstone that faceted stones can't match. Each raw blue stone is unique. The colors include swirls of milky blue, with accents of deep violet and blue-black midnight.

Pluck any of the high fashion magazines off the rack and you'll see that "polished and uncut" gemstones are popping up on haute couture runways from New York to Milan for prices starting at over \$5000.

We were the last to believe that "350 carats" and "affordable" could be used to describe the same necklace. But our trusted sapphire source found a limited quantity of these extra large stones at a terrific price. Wear and admire this remarkable *Raw Sapphire Necklace* for 30 days. If for any reason you are not satisfied, simply return them to us for a full refund of the purchase price. But, once you experience 350 carats of rare deep ocean blue gemstones, destiny and desire will take over.

**JEWELRY SPECS:** - 350 ctw natural raw sapphire necklace  
- Necklace adjustable from 16" to 18" - Bracelet adjustable from 7" to 9"  
- Fastens with a sterling silver lobster clasp.

**Raw Sapphire Necklace** (350 ctw) *Your price \$99* +s&h

**Raw Sapphire Bracelet** (150 ctw) *Your price \$79* +s&h

**Raw Sapphire Earrings** (15 ctw) *Your price \$59* +s&h **FREE\***

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**Martin Lukasiewicz** Thunder Bay, Ontario  
One bird tugging another's tongue was snapped by Martin Lukasiewicz, 29, as he saw a red-headed woodpecker take on a northern flicker. "Both birds would collide in midair and spiral down while trying to inflict as much damage as possible," says Lukasiewicz.

**Gowtham** Houghton, Michigan  
In Michigan's Porcupine Mountains Wilderness State Park, "water flow over intricate rock formations caught my eye," says Gowtham, 29, whose photo was voted an *ngm.com* audience favorite.





Nel Cepeda

Pat Minnick included National Geographic in her financial plans.

## Give An Inspiring Gift

In 2007 Pat Minnick, a professional artist, decided to establish a charitable gift annuity to support National Geographic. She now receives a guaranteed life income and is a direct part of the Society's efforts to inspire people to care about the planet.

"I feel good knowing that National Geographic is doing so much to protect endangered wildlife," says Pat. "The environmental problems we face are vast, but by joining with National Geographic and their history of remarkable accomplishments, I know we can pass on a more beautiful world."

For more information about a charitable gift annuity or other ways to include National Geographic in your estate plans, please contact the Office of Gift Planning.

### Sample Annuity Rates for One Beneficiary

(rates at other ages available upon request)

Age 65 = 5.7%    Age 75 = 6.7%    Age 85 = 8.9%

Minimum age 45. Payments begin at age 65



Office of Gift Planning  
1145 17th Street NW  
Washington, DC 20036

(800) 226 - 4438  
plannedgiftinfo@ngs.org  
www.nationalgeographic.org/donate



The National Geographic Society is a 501(c)(3), tax-exempt organization.

Yes! Please send me information on a National Geographic charitable gift annuity!

Birthdate(s) \_\_\_\_\_

I want to know more about gifts that provide me with income for life

Send me information on including National Geographic in my will

I have already included National Geographic in my will

Name \_\_\_\_\_

Address \_\_\_\_\_

Phone \_\_\_\_\_ Email \_\_\_\_\_

Mail to: National Geographic Office of Gift Planning  
1145 17th Street NW, Washington, DC 20036

**Portrait of Survival** I had just left Tibet and was in Laos, working on a photography book about children around the world, when on January 2, 2000, my life nearly ended. On a remote jungle road, the bus I was riding was sheared in half by a logging truck. I sat right at the point of impact. Suffering massive internal injuries, collapsed lungs, a shredded arm, a broken back, and multiple other fractures, I waited more than 14 hours before receiving any real medical care. I feel blessed that I made it out alive.

But as my healing progressed, I wanted my life back. My desire to continue making pictures inspired me not only to learn how to walk again, but also to endure more than 20 surgeries during the ongoing years of my recovery. Now here I am, against all odds, living what feels like a postscript to a life that almost wasn't.

I am grateful to be healthy enough to travel the world photographing again. It was especially rewarding to return to the Tibetan people who have taught me so much about inner strength over the two decades I have photographed them. On one recent trip, I was driving in the remote eastern region of the Tibetan Plateau when I saw this young girl, part of a crowd returning from a horse festival. It was pouring rain, so I brought her into a nearby school to take her photograph. She was so small that the light from the window barely reached her; I had to stand her on a desk. Even at the age of four, she had a face that seemed to express the underlying sadness of a culture that has been so challenged. Yet



Alison Wright's memoir, *Learning to Breathe*, is published by Hudson Street Press. For more on the Faces of Hope Fund, go to [alisonwright.com](http://alisonwright.com).

she had a look of resilience and tenacity beyond her years. Hers may be the last generation of ethnic Tibetans to survive.

I've dipped more than a toe into the other side of my mortality. I have seen how connected we truly are. It's a daily touchstone for me as I continue to traverse the globe to photograph endangered cultures. It has also inspired me to start the nonprofit Faces of Hope Fund, to provide education and health care for communities in Afghanistan and other parts of Asia. Now with every person I have the privilege to photograph, I'm reminded that we are all in this together—companions in the pilgrimage of life.



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hardworking farm boy.

She was an  
Italian supermodel.

He knew he would  
have just one chance  
to impress her.

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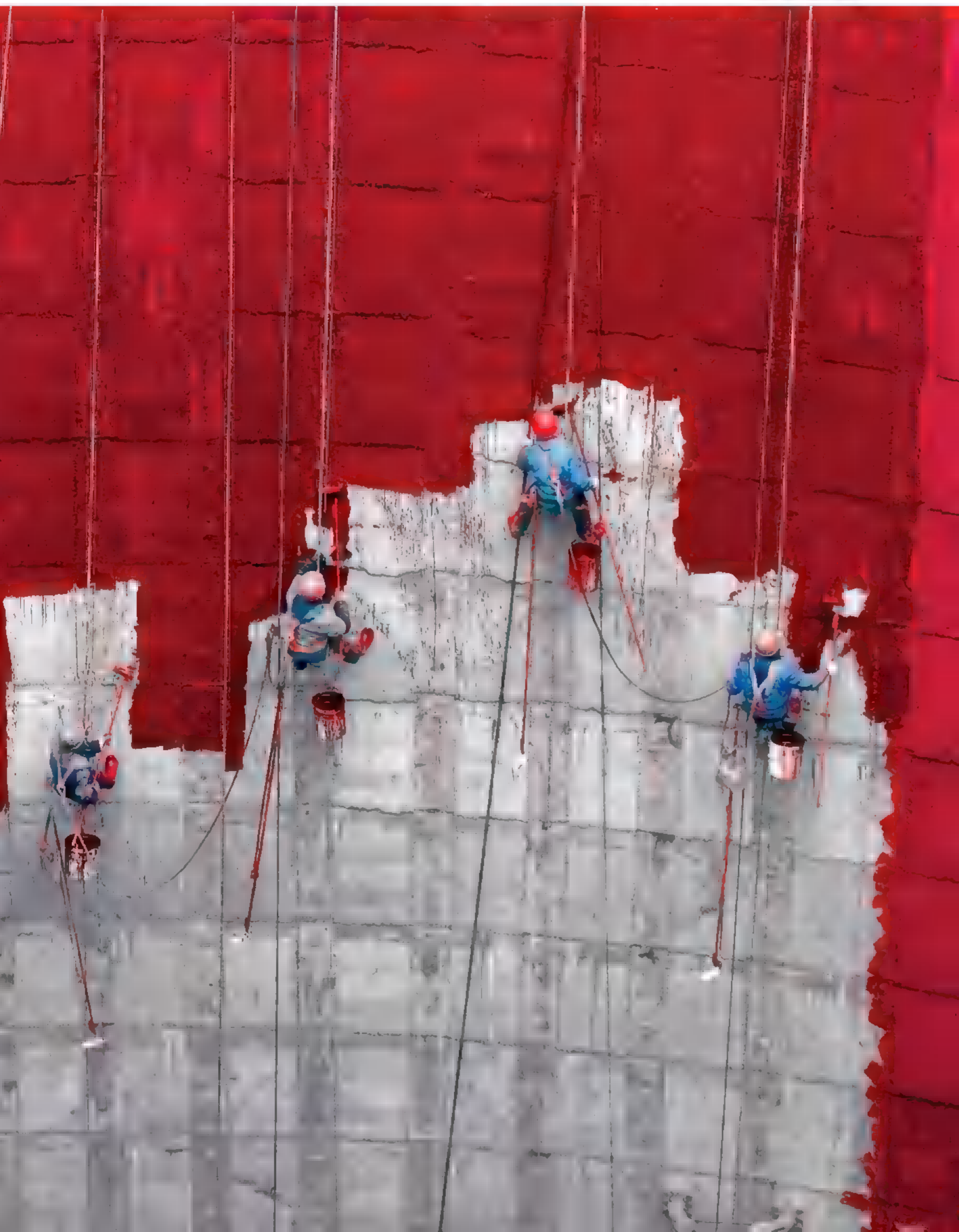
**Bulgaria** Epiphany day at an icy Sofia lake finds young men in hot pursuit. Belief holds that the first to reach the wooden cross, thrown by an Eastern Orthodox priest, will enjoy a year of good health.

PHOTO. DIMITAR DILKOFF, AFP/GETTY IMAGES



**China** Workers apply a rust-resistant primer to a coal-fired power plant in Huaibei, a major industrial center. Soon they'll paint it black, adding a second, waterproof coat to this 470-foot-tall cooling tower.





**Zambia** A lone bull elephant breakfasts at first light near the precipice of Victoria Falls. With the Zambezi River near its seasonal ebb, once submerged walkways—and fresh foraging possibilities—present themselves.



👉 Order prints of *National Geographic* photos online at [PrintsNGS.com](https://www PrintsNGS.com).

PHOTO: MARSEL VAN OOSTEN



# HISTORY



Kentucky roots  
(1809-16)



Indiana youth  
(1816-30)



1787

2008



Illinois career  
(1830-61)



Presidency  
(1861-65)

The 1787 Fugio cent (top) was the first coin authorized by the U.S. government. Four new "tails" for the 2009 penny will pay tribute to Abraham Lincoln's life.

**Endangered Specie** They are buried behind cushions, spit out by parking meters, and cursed by cashiers, yet pennies, apparently, are still loved by Americans. Hence the Treasury is issuing four new designs to honor the bicentennial of Lincoln's birth.

Yet all is not copacetic with the Lincoln cent, as it is officially known. The coins barely contain copper. Since 1982 they've been 97.5 percent zinc. With demand for zinc spiking, the seven billion pennies minted annually now cost well more than a cent each. Analysts say most pennies don't circulate after their first transaction, ending up in drawers and jars, and that millions of tax dollars could be saved by abolishing the coin. Economists contend that rounding prices to the nearest nickel would be a wash for consumers, citing Australia and other nations that have dumped their smallest coins. So who's led the lobbying effort to protect the penny? Schoolkids? Lincoln loyalists? Guess again. It's the zinc industry. —Peter Gwin

# Emergency

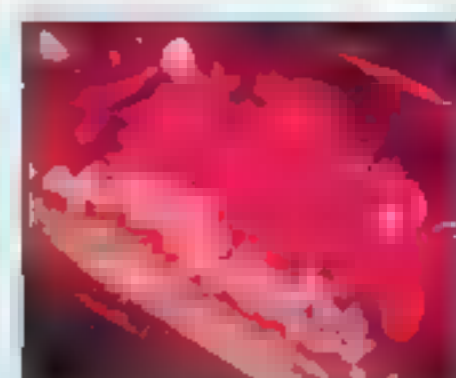
If you've been here before,  
PLAVIX could help keep you from coming back.

**PLAVIX can help save lives for those who've had a heart attack caused by a completely blocked artery.**



Clots that block off arteries are the main cause of heart attack. And now that you've had a heart attack you are at a greater risk of having another that can be fatal. That's why your doctor may put you on PLAVIX along with your

other heart medicines. Taking PLAVIX with your other heart medicines goes beyond what other heart medicines alone can do to keep blood platelets from sticking together and forming dangerous clots.



**IMPORTANT INFORMATION:** If you have a stomach ulcer or other condition that causes bleeding, you should not use PLAVIX. When taking PLAVIX alone or with some other medicines including aspirin, the risk of bleeding may increase so tell your doctor before planning surgery. And, always talk to your doctor before taking aspirin or other medicines with PLAVIX, especially if you've had a stroke. If you develop fever, unexplained weakness or confusion, tell your doctor promptly as these may be signs of a rare but potentially life-threatening condition called TTP, which has been reported rarely, sometimes in less than 2 weeks after starting therapy. Other rare but serious side effects may occur.

**Ask your doctor how PLAVIX can help increase your protection against future heart attack, stroke, and even death.** Or visit [www.plavix.com](http://www.plavix.com) or call 1-800-380-4709.

See important product information on the following page.

You are encouraged to report negative side effects of prescription drugs to the FDA. Visit [www.fda.gov/medwatch](http://www.fda.gov/medwatch), or call 1-800-FDA-1088.

If you need help paying for prescription medicines, you may be eligible for assistance. Call 1-888-4PPA-NOW (1-888-477-2669), or go to [www.pparx.org](http://www.pparx.org)



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ONCE-A-DAY  
**Plavix**<sup>®</sup>  
(clopidogrel bisulfate) 75mg tablets  
**Protection that helps save lives.**

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### WHO IS PLAVIX FOR?

PLAVIX is a prescription-only medicine that helps keep blood platelets from sticking together and forming clots.

PLAVIX is for patients who have:

- had a recent heart attack.
- had a recent stroke.
- poor circulation in their legs (Peripheral Artery Disease).

PLAVIX in combination with aspirin is for patients hospitalized with:

- heart-related chest pain (unstable angina).
- heart attack.

Doctors may refer to these conditions as ACS (Acute Coronary Syndrome).

Clots can become dangerous when they form inside your arteries. These clots form when blood platelets stick together, forming a blockage within your arteries, restricting blood flow to your heart or brain, causing a heart attack or stroke.

### WHO SHOULD NOT TAKE PLAVIX?

You should NOT take PLAVIX if you:

- are allergic to clopidogrel (the active ingredient in PLAVIX).
- have a stomach ulcer
- have another condition that causes bleeding.
- are pregnant or may become pregnant.
- are breast feeding.

### WHAT SHOULD I TELL MY DOCTOR BEFORE TAKING PLAVIX?

Before taking PLAVIX, tell your doctor if you're pregnant or are breast feeding or have any of the following:

- gastrointestinal ulcer
- stomach ulcer(s)
- liver problems
- kidney problems
- a history of bleeding conditions

### WHAT IMPORTANT INFORMATION SHOULD I KNOW ABOUT PLAVIX?

**TTP:** A very serious blood condition called TTP (Thrombotic Thrombocytopenic Purpura) has been rarely reported in people taking PLAVIX. TTP is a potentially life-threatening condition that involves low blood platelet and red blood cell levels, and requires urgent referral to a specialist for prompt treatment once diagnosis is suspected. Warning signs of TTP may include fever, unexplained confusion or weakness (due to a low blood count, what doctors call anemia). To make an accurate diagnosis, your doctor will need to order blood tests. TTP has been reported rarely, sometimes in less than 2 weeks after starting therapy.

**Gastrointestinal Bleeding:** There is a potential risk of gastrointestinal (stomach and intestine) bleeding when taking PLAVIX. PLAVIX should be used with caution in patients who have lesions that may bleed (such as ulcers), along with patients who take drugs that cause such lesions.

**Bleeding:** You may bleed more easily and it may take you longer than usual to stop bleeding when you take PLAVIX alone or in combination with aspirin. Report any unusual bleeding to your doctor.

**Geriatrics:** When taking aspirin with PLAVIX the risk of serious bleeding increases with age in patients 65 and over.

**Stroke Patients:** If you have had a recent TIA (also known as a mini-stroke) or stroke taking aspirin with PLAVIX has not been shown to be more effective than taking PLAVIX alone, but taking aspirin with PLAVIX has been shown to increase the risk of bleeding compared to taking PLAVIX alone.

**Surgery:** Inform doctors and dentists well in advance of any surgery that you are taking PLAVIX so they can help you decide whether or not to discontinue your PLAVIX treatment prior to surgery.

### WHAT SHOULD I KNOW ABOUT TAKING OTHER MEDICINES WITH PLAVIX?

You should only take aspirin with PLAVIX when directed to do so by your doctor. Certain other medicines should not be taken with PLAVIX. Be sure to tell your doctor about all of your current medications, especially if you are taking the following:

- aspirin
- nonsteroidal anti-inflammatory drugs (NSAIDs)
- warfarin
- heparin

Be sure to tell your doctor if you are taking PLAVIX before starting any new medication.

### WHAT ARE THE COMMON SIDE EFFECTS OF PLAVIX?

The most common side effects of PLAVIX include gastrointestinal events (bleeding, abdominal pain, indigestion, diarrhea, and nausea) and rash. This is not a complete list of side effects associated with PLAVIX. Ask your doctor or pharmacist for a complete list.

### HOW SHOULD I TAKE PLAVIX?

Only take PLAVIX exactly as prescribed by your doctor. Do not change your dose or stop taking PLAVIX without talking to your doctor first.

PLAVIX should be taken around the same time every day, and it can be taken with or without food. If you miss a day, do not double up on your medication. Just continue your usual dose. If you have any questions about taking your medications, please consult your doctor.

### OVERDOSAGE

As with any prescription medicine, it is possible to overdose on PLAVIX. If you think you may have overdosed, immediately call your doctor or Poison Control Center, or go to the nearest emergency room.

### FOR MORE INFORMATION

For more information on PLAVIX, call 1-800-633-1610 or visit [www.PLAVIX.com](http://www.PLAVIX.com). Neither of these resources, nor the information contained here, can take the place of talking to your doctor. Only your doctor knows the specifics of your condition and how PLAVIX fits into your overall therapy. It is therefore important to maintain an ongoing dialogue with your doctor concerning your condition and your treatment.

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**GERMANY**  
Pickled herring



**ITALY**  
Coffee

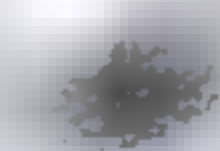


**JAPAN**  
Pickled plums



**U.S.A.**  
Tomato juice,  
eggs

**DENMARK**  
Salt



**POLAND**  
Sour pickle juice



**NETHERLANDS**  
Beer

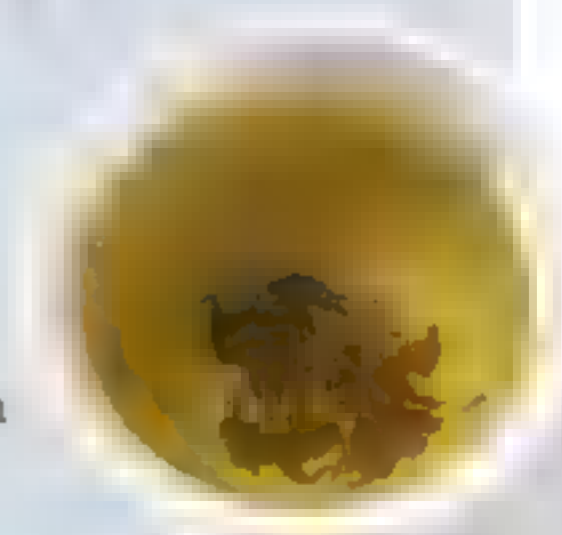


**MEXICO**  
Shrimp



**ROMANIA**  
Tripe soup

**CHINA**  
Strong  
green tea



**RUSSIA**  
Leafy birch branches  
(to whip toxins  
out of a hungover  
drinker in a sauna)



## Hangover Helpers

As 2008 ends, consider adding "discover cure for hangover" to your list of New Year's resolutions. Drinkers everywhere would thank you. As long as people have been imbibing, they've been suffering the effects of excess, including sweating, nausea, anxiety, and headache. Yet the degree of misery depends on so many factors—how much and what type of alcohol was consumed, the drinker's size, even personality (those prone to anger may feel the worst)—that a panacea might be medically impossible.

That's why people persist in using hangover "cures" based on culture and opinion, ranging from bracing soups to hair-of-the-dog drinks. Doctors, for their part, urge water, aspirin, and vitamins. Before you drink at all, though, try to remember a universal tip: everything in moderation. —Catherine L. Barker

Around the world, suggestions abound for how to cope with the effects of one too many.

PHOTOS: REBECCA HALE, NG STAFF, CATY SMITH



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In the land of the midnight sun, the Rolex Explorer II allows expedition leaders to remain oriented to day and night. A direct descendant of the legendary Rolex watches that extend the limits of man and technology, few environments are too extreme for the Explorer II. [ROLEX.COM](http://ROLEX.COM)

**ROLEX**

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**A Bicycle Bump** Pedaling to work one morning in Atlanta, Jesi Hirsch was rear-ended by a car. The 53-year-old nurse belly flopped and got a bad case of road rash. A passerby said, "You're lucky you could get up at all." After that, Hirsch gave up biking.



In May she moved to Portland, Oregon—and got back in the saddle. Portland has 171 miles of bike lanes, ten freshly painted green boxes that put cyclists safely ahead of vehicles, even some signals just for bikes. It's "the best of the bigger cities for cycling," says Andy Clarke, president of the League of American Bicyclists. Hirsch logs ten miles a day on errands and pleasure rides. "Cars stop for you," she marvels. Indeed, injuries from bike-car crashes have stayed at 150 to 200 a year as ridership has soared.

What would it take for a city to be as bikeable as Portland? A redivision of street space and lots of paint. And what would it take to encourage more cycling? The federal Bike Commuter Act is a good start. As of January 1, employers can give a \$20 monthly tax-free credit to cyclists for bike-related bills. —Marc Silver

**Bikes on bus racks**  
April to August 2008

Houston, TX **+235%**  
1,510 to 5,059 bikes

Hartford, CT **+159%**  
820 to 2,122

Charlotte, NC **+71%**  
4,977 to 8,519

**BIKE SPIKE**

The rise in gas prices has set off a cycling spurt. One measure: The use of bike racks on buses is soaring.



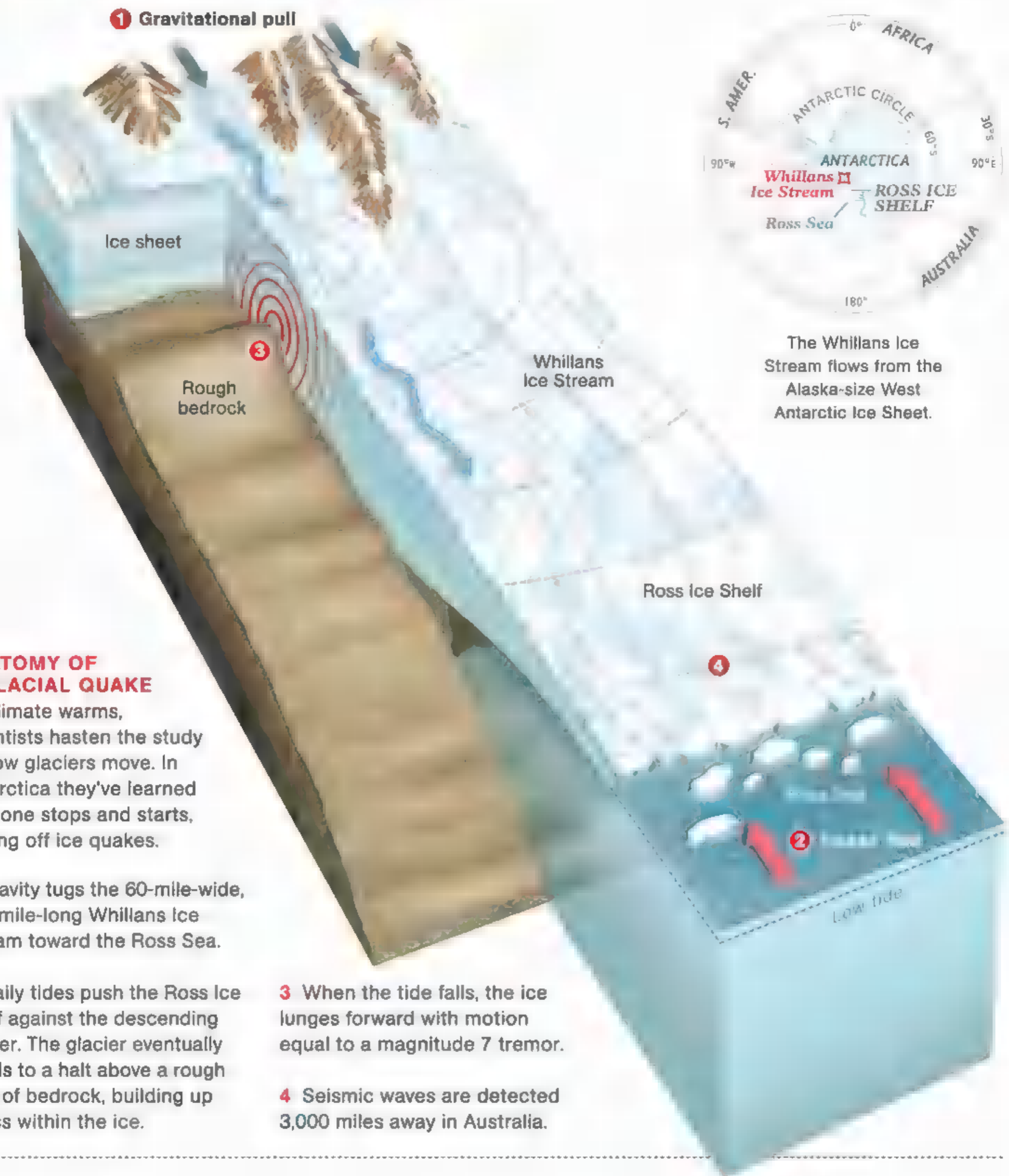
The bike box, a European innovation, gives Portland, Oregon, bikers a jump on traffic.

**Stranded in the Sky** The first animal to join the endangered species list because of climate change was the polar bear. The next may be the American pika. These rabbit relatives spend summers scampering around mountaintop boulder fields, gathering plants to store for winter meals and ducking under rocks to hide from eagles and weasels. They cry *eeep!* for danger. Even serious biologists say the pika is the cutest animal in the West.

The thick fur that lets pikas thrive in the cold could be their downfall. They can overheat and die in a few hours at 80°F. As temperatures climb, pikas are stuck on what scientists call “sky islands.” They can’t head down to find a cooler mountain because valleys are often too hot to cross. Heading upslope isn’t much better; a higher altitude boulder field might not have enough vegetation. Pikas have already disappeared from some of their patches. —Helen Fields



The pika's round shape conserves heat—helpful in the cold, deadly on a warming Earth.



## ANATOMY OF A GLACIAL QUAKE

As climate warms, scientists hasten the study of how glaciers move. In Antarctica they've learned how one stops and starts, setting off ice quakes.

**1** Gravity tugs the 60-mile-wide, 300-mile-long Whillans Ice Stream toward the Ross Sea.

**2** Daily tides push the Ross Ice Shelf against the descending glacier. The glacier eventually grinds to a halt above a rough area of bedrock, building up stress within the ice.

**3** When the tide falls, the ice lunges forward with motion equal to a magnitude 7 tremor.

**4** Seismic waves are detected 3,000 miles away in Australia.

**Ice-Shaking News** Most folks think that all glaciers move alike, creeping steadily toward sea or valley. News from Antarctica tells a joltingly different tale. Usually twice a day the massive Whillans Ice Stream, after sticking for hours on a plain of bedrock, slips forward up to two feet, triggering seismic waves equal to a magnitude 7 earthquake. Locating the source of the powerful quakes, researchers led by Douglas Wiens of Washington University in St. Louis suggest the unusual behavior occurs because the half-mile-thick glacier gets caught on the bedrock until tides from the Ross Sea free it. Someone standing on the ice wouldn't feel or see a thing. The slip plays out slowly, taking 20 to 30 minutes. Says Wiens, "It's an earthquake at glacial speed." —Tom O'Neill



▶ See this video, in Arabic, at [youtube.com/watch?v=54pRjKJ6B6E](https://youtube.com/watch?v=54pRjKJ6B6E).

A video of activist Wajeha Al-Huwaider (above) was posted on YouTube to protest the Saudi ban on female drivers.

**Driving Concerns** If luxury-brand autos and SUVs—the trappings of conspicuous consumption and 46-cents-a-gallon gas—are the most visible things on Saudi Arabia's highways, ■ close second may be non-Saudi chauffeurs. Women are not permitted to drive in Saudi Arabia, so opportunities abound for immigrants willing to take mothers shopping and daughters to school.

Neither Saudi legislation nor Muslim tradition actually forbids women to drive. Deep in the kingdom's deserts, away from police, women often get behind the wheel. Yet female drivers in urban areas are routinely arrested. In 1991 protests against the ban met with swift government action. Protesters' passports were confiscated, and few dared speak up after that. Recently, though, women's groups have petitioned Saudi's King Abdullah to consider changing the policy. Advocates point out that mobilizing half the country's population would offer great economic benefits. Permission to drive would be a triumphant step for Saudi women. It might also be ■ brave one; according to one report, 81 percent of deaths in Saudi Ministry of Health hospitals are related to car accidents. —Cord Jefferson

# The Price of Gold

In dollars  
and suffering,  
it's never  
been higher.







Fevered by hopes of striking it rich, illegal miners claw sacks of "money stone"—gold ore—from the Pra River in Ghana. Their toil feeds the world's hunger for gold, and leaves a ruined landscape in its wake.



At recent prices, one 28-pound bar held by the Federal Reserve Bank New York worth more than \$335,000. Inside the vault officials transfer dozens of bars in a transaction between clients.



The allure of gold dominates Chennai street in September, just before India's wedding season, when jewelry sales soar. India is the top gold consumer, its citizens buying as much for investment as adornment.



Wedding  
JEWELLERY





**By Brook Larmer**

**Photographs by Randy Olson**



ike many of his Inca ancestors, Juan Apaza is possessed by gold. Descending into an icy tunnel 17,000 feet up in the Peruvian Andes, the 44-year-old miner stuffs a wad of coca leaves into his mouth to brace himself for the inevitable hunger and fatigue. For 30 days each month Apaza toils, without pay, deep inside this mine dug down under a glacier above the world's highest town, La Rinconada. For 30 days

he faces the dangers that have killed many of his fellow miners—explosives, toxic gases, tunnel collapses—to extract the gold that the world demands. Apaza does all this, without pay, so that he can make it to today, the 31st day, when he and his fellow miners are given a single shift, four hours or maybe a little more, to haul out and keep as much rock as their weary shoulders can bear. Under the ancient lottery system that still prevails in the high Andes, known as the *cachorro*, this is what passes for a paycheck: a sack of rocks that may contain a small fortune in gold or, far more often, very little at all.

Apaza is still waiting for a stroke of luck. “Maybe today will be the big one,” he says, flashing a smile that reveals a single gold tooth. To improve his odds, the miner has already made his “payment to the Earth”: a bottle of pisco, the local liquor, placed near the mouth of the mine; a few coca leaves slipped under a rock; and, several months back, a rooster sacrificed by a shaman on the sacred mountaintop. Now, heading into the tunnel, he mumbles a prayer in his native Quechua language to the deity who rules the mountain and all the gold within.

“She is our Sleeping Beauty,” says Apaza, nodding toward a sinuous curve in the snowfield high above the mine. “Without her blessing we would never find any gold. We might not make it out of here alive.”

It isn't El Dorado, exactly. But for more than 500 years the glittering seams trapped beneath the glacial ice here, three miles above sea level, have drawn people to this place in Peru. Among the first were the Inca, who saw the perpetually lustrous metal as the “sweat of the sun”; then the Spanish, whose lust for gold and silver spurred the conquest of the New World. But it is only now, as the price of gold soars—it has risen 235 percent in the past eight years—that 30,000 people have flocked to La Rinconada, turning a lonely prospectors' camp into a squalid shantytown on top of the world. Fueled by luck and desperation, sinking in its own toxic waste and lawlessness, this no-man's-land now teems with dreamers and schemers anxious to strike it rich, even if it means destroying their environment—and themselves—in the process.

The scene may sound almost medieval, but

**Villagers in the war-weary Ituri region of the Democratic Republic of the Congo scrape for gold in a shaft dug decades ago by a Belgian company. Until recently, armed groups controlled Ituri's rich mines, using gold to buy weapons.**

La Rinconada is one of the frontiers of a thoroughly modern phenomenon: a 21st-century gold rush.

**NO SINGLE ELEMENT** has tantalized and tormented the human imagination more than the shimmering metal known by the chemical symbol Au. For thousands of years the desire to possess gold has driven people to extremes, fueling wars and conquests, girding empires and currencies, leveling mountains and forests. Gold is not vital to human existence; it has, in fact, relatively few practical uses. Yet its chief virtues—its unusual density and malleability along with its imperishable shine—have made it one of the world's most coveted commodities, a transcendent symbol of beauty, wealth, and immortality. From pharaohs (who insisted on being buried in what they called the “flesh of the gods”) to the forty-niners (whose mad rush for the mother lode built the American West) to the financiers (who, following Sir Isaac Newton's advice, made it the bedrock of the global economy): Nearly every society through the ages has invested gold with an almost mythological power.

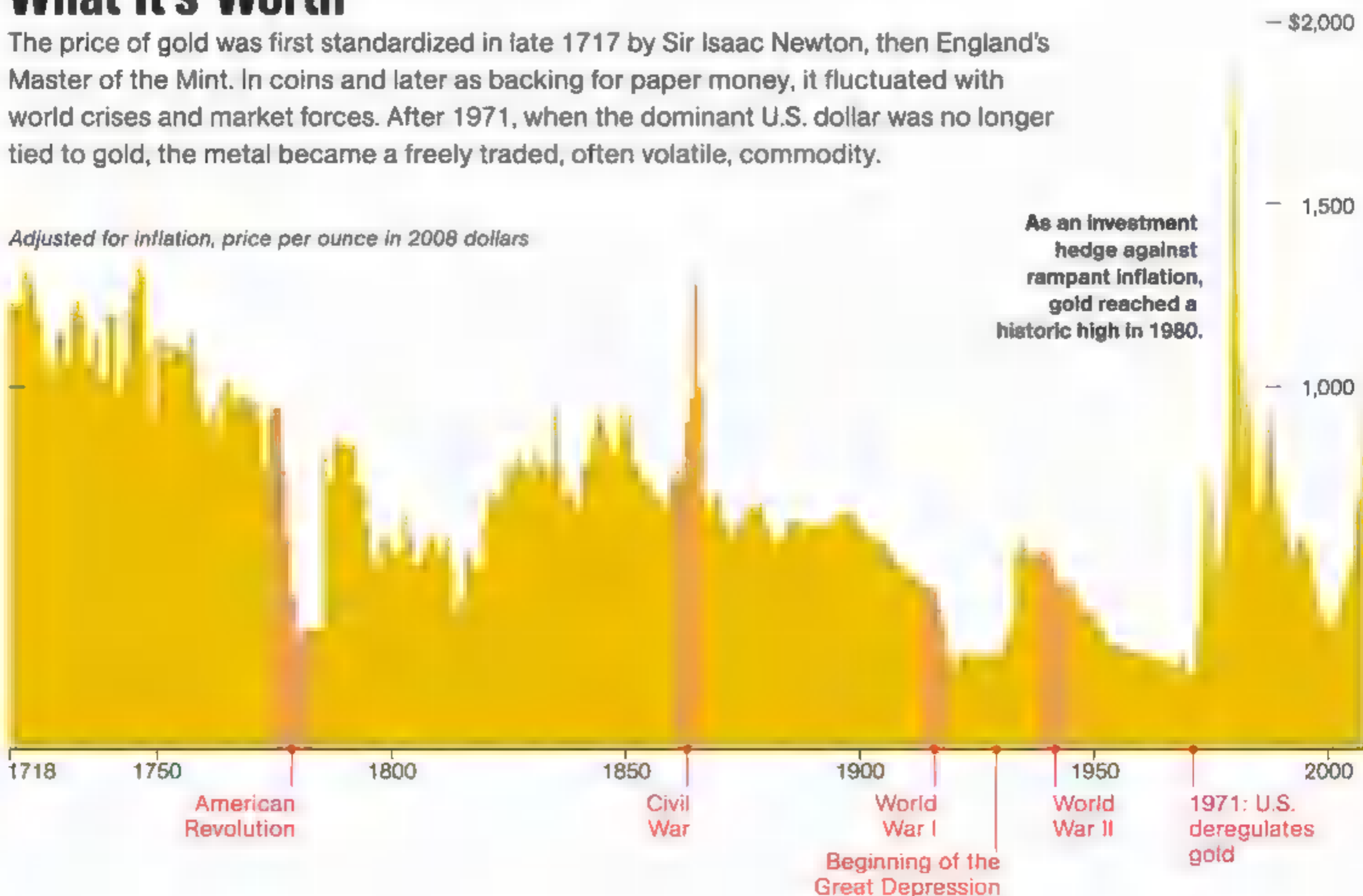
Humankind's feverish attachment to gold shouldn't have survived the modern world. Few cultures still believe that gold can give eternal life, and every country in the world—the United States was last, in 1971—has done away with the gold standard, which John Maynard Keynes famously derided as “a barbarous relic.” But gold's luster not only endures; fueled by global uncertainty, it grows stronger. The price of gold, which stood at \$271 an ounce on September 10, 2001, hit \$1,023 in March 2008, and it may surpass that threshold again. Aside from extravagance, gold is also reprising its role as a safe haven in perilous times. Gold's recent surge, sparked in part by the terrorist attack on 9/11, has been amplified by the slide of the U.S. dollar and jitters over a looming global recession. In 2007 demand outstripped mine production by 59 percent. “Gold has always had this kind of magic,” says Peter L. Bernstein, author of *The Power of Gold*. “But it's never been clear if we have gold—or gold has us.”

While investors flock to new gold-backed funds, jewelry still accounts for two-thirds of the demand, generating a record \$53.5 billion in worldwide sales in 2007. In the U.S. an

## What It's Worth

The price of gold was first standardized in late 1717 by Sir Isaac Newton, then England's Master of the Mint. In coins and later as backing for paper money, it fluctuated with world crises and market forces. After 1971, when the dominant U.S. dollar was no longer tied to gold, the metal became a freely traded, often volatile, commodity.

Adjusted for inflation, price per ounce in 2008 dollars





After its coating of mercury is burned off, a gram of gold may fetch \$25 for an Indonesian miner, while exacting a potentially heavy cost to his health. Using mercury to separate gold from rock, millions of small-scale miners worldwide inhale toxic vapors during the refining process, exposing themselves to neurological and genetic damage. Waste mercury in liquid form enters river sediments and vegetation, poisoning local food chains.



activist-driven “No Dirty Gold” campaign has persuaded many top jewelry retailers to stop selling gold from mines that cause severe social or environmental damage, but such concerns don’t ruffle the biggest consumer nations, namely India, where a gold obsession is woven into the culture, and China, which leaped past the U.S. in 2007 to become the world’s second largest buyer of gold jewelry.

For all of its allure, gold’s human and environmental toll has never been so steep. Part of the challenge, as well as the fascination, is

that there is so little of it. In all of history, only 161,000 tons of gold have been mined, barely enough to fill two Olympic-size swimming pools. More than half of that has been extracted in the past 50 years. Now the world’s richest deposits are fast being depleted, and new discoveries are rare. Gone are the hundred-mile-long gold reefs in South Africa or cherry-size nuggets in California. Most of the gold left to mine exists as traces buried in remote and fragile corners of the globe. It’s an invitation to destruction. But there is no shortage of

## How It’s Used

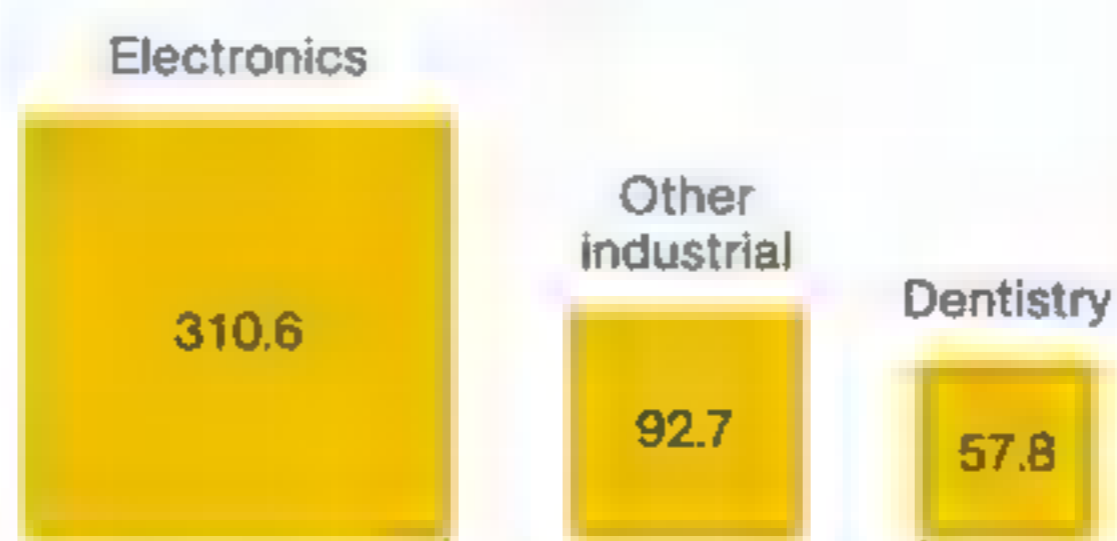
Jewelry dominates gold consumption. The metal is also critical in electronics as an efficient, noncorroding conductor; gold-backed investment funds are growing.

### JEWELRY

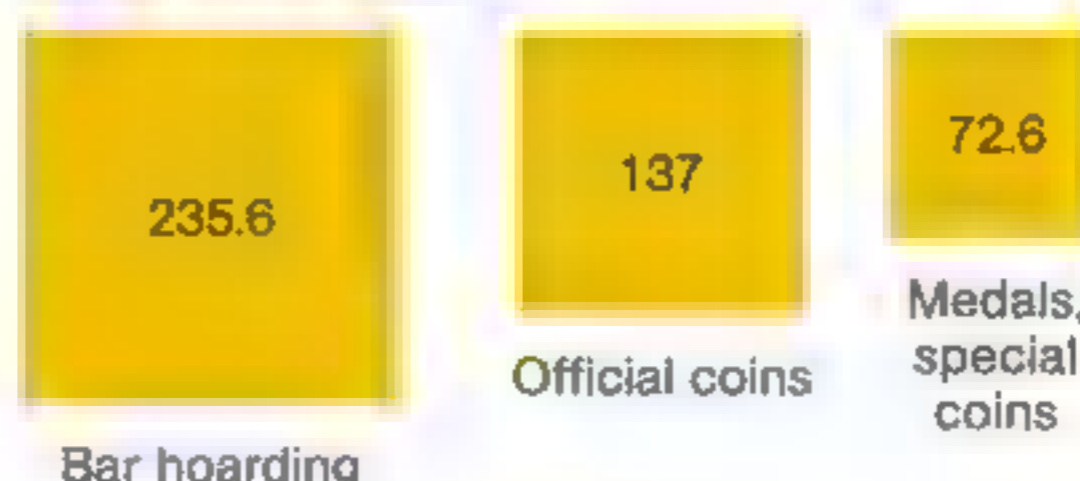


In tons, excluding central banks, 2007

### INDUSTRIAL AND DENTAL



### RETAIL INVESTMENT



### EXCHANGE-TRADED FUNDS



miners, big and small, who are willing to accept.

At one end of the spectrum are the armies of poor migrant workers converging on small-scale mines like La Rinconada. According to the United Nations Industrial Development Organization (UNIDO), there are between 10 million and 15 million so-called artisanal miners around the world, from Mongolia to Brazil. Employing crude methods that have hardly changed in centuries, they produce about 25 percent of the world's gold and support a total of 100 million people. It's a vital activity for these people—and deadly too.

In the Democratic Republic of the Congo in the past decade, local armed groups fighting for control of gold mines and trading routes have routinely terrorized and tortured miners and used profits from gold to buy weapons and fund their activities. In the Indonesian province of East Kalimantan, the military, along with security forces of an Anglo-Australian gold company, forcibly evicted small-scale miners and burned their villages to make way for a large-scale mine. Thousands of protestors against expansion of a mine in Cajamarca, Peru, faced tear gas and police violence.

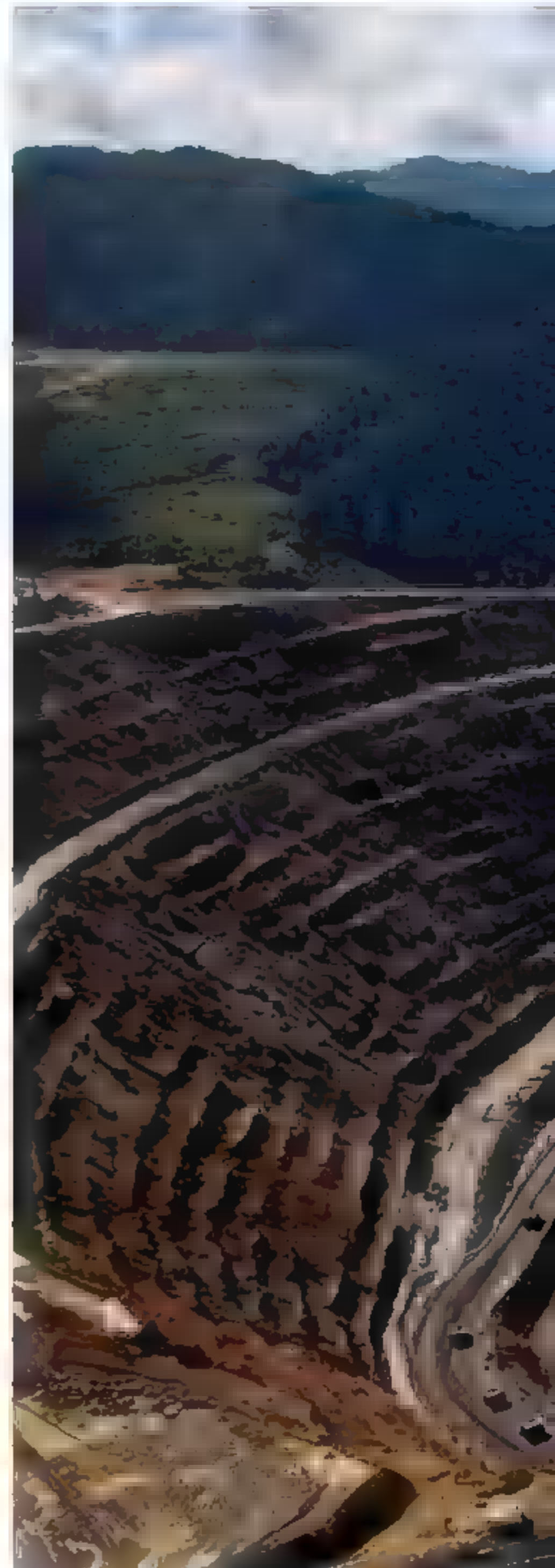
The deadly effects of mercury are equally hazardous to small-scale miners. Most use mercury to separate gold from rock, spreading poison in both gas and liquid forms. UNIDO estimates that one-third of all mercury released by humans into the environment comes from artisanal gold mining. This turns places like La Rinconada into a sort of Shangri-la in reverse: The pursuit of a metal linked to immortality only serves to hasten the miners' own mortality.

At the other end of the spectrum are vast, open-pit mines run by the world's largest mining companies. Using armadas of supersize machines, these big-footprint mines produce three-quarters of the world's gold. They can also bring jobs, technologies, and development to forgotten frontiers. Gold mining, however, generates more waste per ounce than any other metal, and the mines' mind-bending disparities of scale show why: These gashes in the Earth are so massive they can be seen from space,

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*Brook Larmer wrote about the Yellow River for the May 2008 special issue on China. Randy Olson portrayed China's middle class for the same issue.*

**Mile-wide Batu Hijau, a copper and gold mine, generates profits and problems on the Indonesian island of Sumbawa. Opened in 2000 by U.S.-based Newmont Mining Corporation, the huge mine employs 8,000 Indonesians. But massive amounts of waste rock have buried rain forest. Operators expect gold to run out in about 20 years.**



yet the particles being mined in them are so microscopic that, in many cases, more than 200 could fit on the head of a pin. Even at showcase mines, such as Newmont Mining Corporation's Batu Hijau operation in eastern Indonesia, where \$600 million has been spent to mitigate the environmental impact, there is no avoiding the brutal calculus of gold mining. Extracting a single ounce of gold there—the amount in a typical wedding ring—requires the removal of more than 250 tons of rock and ore.

**AS A GIRL GROWING UP** on the remote Indonesian island of Sumbawa, Nur Piah heard tales about vast quantities of gold buried beneath the mountain rain forests. They were legends—until geologists from an American company,



Newmont Mining Corporation, discovered a curious green rock near a dormant volcano eight miles from her home. The rock's mossy tint meant it contained copper, an occasional companion to gold, and it wasn't long before Newmont began setting up a mine named Batu Hijau, meaning "green rock."

Nur Piah, then 24, replied to a Newmont ad seeking "operators," figuring her friendly manner would get her a job answering phones. When the daughter of a Muslim cleric arrived for training, though, her boss showed her a different operating booth—the cab of a Caterpillar 793 haul truck, one of the world's largest trucks. Standing 21 feet tall and 43 feet long, the truck was bigger than her family home. Its wheels alone were double her height. "The truck

terrified me," Nur Piah recalls. Another shock soon followed when she saw the first cut of the mine itself. "They had peeled the skin off the Earth!" she says. "I thought, Whatever force can do that must be very powerful."

Ten years later, Nur Piah is part of that force herself. Pulling a pink head scarf close around her face, the mother of two smiles demurely as she revs the Caterpillar's 2,337-horsepower engine and rumbles into the pit at Batu Hijau. Her truck is part of a 111-vehicle fleet that hauls close to a hundred million tons of rock out of the ground every year. The 1,800-foot volcano that stood here for millions of years? No hint of it remains. The space it once occupied has been turned into a mile-wide pit that reaches 345 feet below sea level. By the time the seam at Batu





Desiree Pillay once balanced business and motherhood, weighing gold that miners brought to her store in remote Menzies Landing, Guyana. Today, eight years later, she sees more tourists than gold diggers. Nearby Kaieteur National Park has been expanded, pushing miners out.



Indonesian farmers turn their hoes to mining, illegally digging for gold on a torn-up riverbank in Borneo. For the chance to make five dollars a day, thousands have left their fields to join Indonesia's gold rush.





Hijau is exhausted in 20 years or so, the pit will bottom out at 1,500 feet below sea level. The environmental wreckage doesn't concern Nur Piah anymore. "I only think about getting my salary," she says.

There is one thing, however, that Nur Piah finds curious: In a decade at Batu Hijau, she has never seen a speck of the gold she has helped mine. The engineers monitoring the process track its presence in the copper compounds to which it adheres. And since the gold is shipped out to smelters overseas in copper concentrate, nobody on Sumbawa ever sees the hidden treasure that has transformed their island.

Pushed by rising gold prices and the depletion of deposits in the U.S., South Africa, and Australia, the world's largest mining companies

are pursuing gold to the ends of the Earth. Few companies have gone global more aggressively than Newmont, a Denver-based mining giant that now runs open-pit gold mines on five continents, from the lowlands of Ghana to the mountaintops of Peru. Lured by the benefits of operating in the developing world—lower costs, higher yields, fewer regulations—Newmont has generated tens of thousands of jobs in poor regions. But it has also come under attack for everything from ecological destruction to the forced relocation of villagers. At Batu Hijau, where Newmont, the single largest shareholder, is wholly responsible for the mine's operation, the company has responded by ramping up community development and environmental programs—and dismissing its critics.





**Manpower at an improvised mine in Ghana includes a 13-year-old boy put to work sluicing for gold. Large mining firms control just 4 percent of Ghana's territory, but a landgrab by those firms evicted thousands of villagers from their homes, forcing many to survive by poaching gold. Illegal mining produces 25 percent of the world's gold.**

“Why is it that activists thousands of miles away are yelling, but nobody around the mine complains?” asks Malik Salim, Batu Hijau’s senior external relations manager. “Gold is what drives everybody crazy.”

Most inhabitants of Sumbawa are farmers and fishermen who reside in wooden shacks built on stilts, their lives virtually untouched by the modern world. But inside the gates at Batu Hijau, Newmont has carved out of the jungle an American-style suburb, where some 2,000 of the mine’s 8,000 employees live. Along the smoothly paved streets there is a bank, an international school, even a broadcast center that produces Newmont’s in-house television channel. Families arrive in SUVs for free-pizza night at a restaurant overlooking a lush golf course.

Up the road there is a basketball gymnasium that Newmont staffers jokingly refer to as “the second home of the Denver Nuggets.”

The name is fitting for a Colorado-based gold-mining company, though there are no nuggets here. And therein lies the problem. Higher prices and advanced techniques enable companies to profitably mine microscopic flecks of gold; to separate gold and copper from rock at Batu Hijau, Newmont uses a finely tuned flotation technology that is nontoxic, unlike the potentially toxic cyanide “heap leaching” the company uses in some of its other mines. Even so, no technology can make the massive waste generated by mining magically disappear. It takes less than 16 hours to accumulate more tons of waste here than all of the tons of gold mined in human history. The waste comes in two forms: discarded rock, which is piled into flat-topped mountains spread across what used to be pristine rain forest, and tailings, the effluent from chemical processing that Newmont pipes to the bottom of the sea.

This method of “submarine tailings disposal” is effectively banned in most developed countries because of the damage the metal-heavy waste can do to the ocean environment, and Newmont practices it nowhere but in Indonesia. Four years ago an Indonesian court brought criminal charges against a Newmont subsidiary—even jailing five of its employees for a month—for pumping pollutants into the sea near its now defunct Buyat Bay mine on the island of Sulawesi. Newmont was acquitted of all charges in 2007. Despite critics’ claims that the court caved in to the mining industry, Newmont defends its reliance on ocean dumping at Batu Hijau. “Land disposal would be cheaper but more damaging to the environment,” argues Rachmat Makkasau, Batu Hijau’s senior process manager. The tailings at Batu Hijau are released 2.1 miles offshore at a depth of 400 feet, above a steep drop-off that carries the waste down more than 10,000 feet. “We closely monitor the quality of the tailings, pipes, and seabed,” says Makkasau. “At that depth, we are only affecting some ‘sea insects.’”

The deep sea may not have many defenders, but the rain forest does. And that may be one reason Batu Hijau’s mountains of waste rock, rather than its submarine tailings, are fueling a conflict with the Indonesian government.

Newmont's environmental department—now 87 strong—stresses its efforts to reclaim the heaps of discarded rock, covering them with ten feet of soil and letting the jungle take root. Nothing can restore the pristine rain forest, of course, and Newmont faces a further problem: After ten years of operations, it is running out of room to dump the waste from Batu Hijau. Three years ago, the company applied to renew a permit to clear another 79 acres of rain forest. So far, Jakarta has not granted it, as environmentalists point to the near disappearance of the yellow-crested cockatoo on Sumbawa. With limited space, Batu Hijau's haul trucks are now getting caught in traffic, hurting

**In all of history, only 161,000 tons of gold have been mined, barely enough to fill two Olympic pools. More than half has been extracted in the past 50 years.**

the mine's efficiency. If more rain forest is not granted soon, Newmont officials have warned, they will be compelled to lay off several hundred Indonesian workers.

The imbroglio lays bare a surprising rift between Newmont and its once friendly Indonesian hosts. Batu Hijau was supposed to be a model mine, and Newmont likes to tout its benefits: the \$391 million in local royalties and taxes it paid in 2007, the more than 8,000 jobs it has created for Indonesians, the reported \$600 million spent to minimize environmental damage. Then there's the more than \$3 million Newmont spends each year on community development. It may be a pittance compared with the company's annual revenues, but it has provided the five villages closest to the mine with electricity, health clinics, irrigation dams, and agriculture projects.

Not all of the locals, however, feel grateful. Outside the five subsidized villages, the mine's presence has brought little more than envy (as those who don't have mining jobs resent those who do) and frustration (as the influx of mining salaries drives up the cost of living). One flash of anger came in 2006, when vandals burned down ■ Newmont exploratory camp in eastern Sumbawa, halting the company's testing for a new mine site.

Now the local and provincial governments, whose power has expanded since the dictator Suharto fell in 1998, are starting to assert themselves. Working with Indonesian business interests, they are moving to capture a share of the mine and a say in how its revenues are distributed. "We had no control over our destiny when these contracts were signed under Suharto," says local People's Council representative Manimbang Kahariyai. "We have to protect our future. What will be left of our environment when the mine is finished?"

Sitting in her new house in the village of Jereweh, Nur Piah is focused more on the present than the future. "So many people depend on me," she says. Her husband makes some money as a timber trader, but Nur Piah's salary—about \$650 ■ month—paid for their two-story concrete home. As if in tribute, she has hung on one wall a large painting of the yellow Caterpillar 793. Nur Piah's job is not without its hardships. Maneuvering the enormous truck over a 12-hour shift is especially stressful, she says, when the pit's graded roads are slicked by torrential rains. But now, after a long day, she smiles contentedly as her child, age six, falls asleep on her lap. The girl's middle name? Higrid, the Indonesian approximation of "high-grade," the best ore in the mine.

**THE GOLD ORNAMENTS** come out of the velvet boxes one by one, family heirlooms that Nagavi, a 23-year-old Indian bride, always knew she would wear on her wedding day. The eldest daughter of a coffee plantation owner in the southern Indian state of Karnataka, Nagavi grew up marveling at the weddings that mark the merger of two wealthy Indian families. But not until the morning of her own arranged wedding to the only son of another coffee plantation family does she understand just how achingly beautiful the golden tradition can be.

By the time Nagavi is ready for her wedding, the university graduate with a predilection for jeans and T-shirts has been transformed into an Indian princess, shimmering in gold. An exquisitely crafted hairpiece is so heavy—five and a half pounds of gold—that it pulls her head back. Three gold necklaces and a dozen bangles act as effective counterweights. Wrapped in an 18-foot-long sari woven with thread dipped in gold, Nagavi walks slowly out of her home, trying to keep her balance as she tosses rice over her head in a traditional gesture of farewell.

The gold treasures Nagavi wears—along with the jewelry and saris packed in the trunk of the SUV taking her to the wedding hall—are not a traditional dowry. In this circle of coffee growers around the town of Chikmagalur, unlike in many poorer parts of the country, it is considered unseemly for a groom's family to make explicit demands. "This is seen as my 'share' of the family wealth," says Nagavi, gazing at the millions of dollars of gold jewelry. As with any Indian wedding, the gold also serves to display the value she brings to the union. "With daughters, you have to start saving gold from the day they are born," says Nagavi's father, C. P. Ravi Shankar. "It's important to marry them off well."

Nowhere is the gold obsession more culturally entrenched than it is in India. Per capita income in this country of a billion people is \$2,700, but it has been the world's runaway leader in gold demand for several decades. In 2007, India consumed 773.6 tons of gold, about 20 percent of the world gold market and more than double that purchased by either of its closest followers, China (363.3 tons) and the U.S. (278.1 tons). India produces very little gold of its own, but its citizens have hoarded up to 18,000 tons of the yellow metal—more than 40 times the amount held in the country's central bank.

India's fixation stems not simply from a love of extravagance or the rising prosperity of an emerging middle class. For Muslims, Hindus, Sikhs, and Christians alike, gold plays a central role at nearly every turning point in life—most of all when a couple marries. There are some ten million weddings in India every year, and in all but a few, gold is crucial both to the spectacle and to the culturally freighted transaction between families and generations. "It's written into our DNA," says K. A. Babu, a manager at the Alapatt jewelry store in the southwestern

city of Cochin. "Gold equals good fortune."

This equation manifests itself most palpably during the springtime festival of Akshaya Tritiya, considered the most auspicious day to buy gold on the Hindu calendar. The quantity of gold jewelry Indians purchase on this day—49 tons in 2008—so exceeds the amount bought on any other day of the year throughout the world that it often nudges gold prices higher.

Throughout the year, though, the epicenter of gold consumption is Kerala, a relatively prosperous state on India's southern tip that claims just 3 percent of the country's population but 7 to 8 percent of its gold market. It's an unusual distinction for a region that has one of the world's only democratically elected Marxist governments, but it is rooted in history. A key port in the global spice trade, Kerala gained an early exposure to gold, from the Romans who offered coins in exchange for pepper, cardamom, and cinnamon to subsequent waves of colonizers, the Portuguese, Dutch, English. But local historians say it was the region's revolt against the Hindu caste system (before which the lowest castes were allowed to adorn themselves only with polished stones and bones), and the mass conversion to Christianity and Islam that followed, that turned gold into something more than commerce: a powerful symbol of independence and upward mobility.

Despite the long history, no era in Kerala has been hungrier for gold than the present. The road from the airport to Cochin is lined with billboards showing women adorned in gold wedding jewelry. India's biggest gold retailers all come from Kerala, and 13 large gold showrooms clog a two-mile stretch of Cochin's main thoroughfare, Mahatma Gandhi Road. (What would the ascetic Mahatma have thought?) Among the upper classes and younger consumers in Delhi and Mumbai, gold may be starting to lose ground to more understated—and expensive—materials like platinum and diamonds. But even as Kerala grows in wealth (thanks to a large number of workers in the Persian Gulf) and education (it boasts a 91 percent literacy rate), the attachment to gold persists. Dowries, though officially banned, dominate most wedding proceedings in India, and in Kerala, the largest portion of the dowry is usually gold.

"We grow up in an atmosphere of gold," says Renjith Leen, an editor at *The Week*, a national





Wearing her fortune, from gold threads in her sari to a priceless heirloom headpiece, Nagavi sits with family on her wedding day in India. Gold trappings advertise the value she'll bring to the union.



Sweating out profit, goldsmiths shed clothes to work in a one-room factory in Kolkata. Given 103 grams in a 100-gram order, the collective keeps whatever is not used in the jewelry-making process.



news magazine based in Cochin. When a baby is born in Kerala, a grandmother rubs a gold coin in honey and places a drop of the liquid on the child's tongue for good luck. At all major occasions over the first six months, from baptism to first ingestion of solid food, the child receives gifts of gold jewelry: earrings, necklaces, waistlets. Then, when the child is three years old, a learned family member takes a gold coin and traces words on his or her tongue to bestow the gift of eloquence.

By themselves, none of these ceremonies captures how deeply gold is ingrained in the Indian economy. "Gold is the basis of our financial system," says Babu, the jewelry store manager.

**In small-scale mines, searching for gold is a family affair. Of the world's 12 to 15 million artisanal gold miners, an estimated 30 percent are women and children.**

"People see it as the best form of security, and nothing else lets you get cash as quickly." Hoarding gold as an intergenerational family nest egg is an ancient tradition in India. So, too, is pawning gold jewelry for emergency loans—and then buying it back. Commercial banks still offer the service, after their attempt to stop it in the 1990s resulted in riots and suicides by debt-laden clients and a government command to continue the practice.

Many farmers in Kerala, however, prefer the speed and easy access of "private financiers" like George Varghese, who operates out of his home three hours south of Cochin. A balding man in his 70s, Varghese says he handles around half a million dollars in pawned gold a month, even more during harvest and wedding seasons. It's almost a perfect business, for even with interest rates that can reach

one percent a day on short-term loans, very few people default. No Indian wants to let go of their gold. "Even when gold hit \$1,000 an ounce, nobody sold their jewelry or coins," says Varghese. "This is their nest egg, and they trust it to keep growing."

As the price of the metal goes up, however, poor Indian families are having a harder time raising the gold they need for dowries. Though the dowry retains a social function—balancing the wealth between the families of bride and groom—the rising price of gold has only fueled its abusive side. In the neighboring state of Tamil Nadu, the struggle to acquire gold has led to dowry-related domestic violence (usually when grooms' families beat the brides for bringing too little gold) and selective abortions (committed by families desperate to avoid the financial burden of a daughter).

Even in Kerala, the pressure is sometimes too much for the poor to take. Rajam Chidambaram, a 59-year-old widow living in a slum on the outskirts of Cochin, recently found a young man to marry her only daughter, age 27. The groom's family, however, demanded a dowry far out of her reach: 25 sovereigns, or 200 grams, of gold (worth \$1,650 eight years ago, but more than \$5,200 today). Chidambaram, a cleaning woman, has only the two earrings she wears; the gold necklace she once owned went to pay off her deceased husband's hospital bills. "I had to agree to the groom's demand," Chidambaram says, wiping away tears. "If I refuse, my daughter will stay home forever."

In the end, local financiers advanced a loan for her daughter's dowry. Chidambaram may have averted the shame of an unmarried daughter, but she is now burdened with a debt that she may spend the rest of her life trying to repay.

**ROSEMERY SÁNCHEZ CONDORI** is just nine years old, but the backs of her hands are burnished like aged leather. That's what happens when a girl spends time pounding rocks under the Andean sun. Ever since Rosemary's father fell ill in the mines of La Rinconada eight years ago, her mother has worked 11-hour days collecting rocks near the mines and hammering them into smaller bits to find flecks of overlooked gold. On school holidays, Rosemary sometimes helps her mother on the mountain. It is child labor, perhaps, but for a girl whose family is living



hand to mouth, it also qualifies as her proudest achievement. "Last year I found two grams of gold," Rosemary says, almost giddily. "It was enough to buy my schoolbooks and uniform."

In small-scale mines around the globe, searching for gold is a family affair. Of the world's 12 to 15 million artisanal gold miners, an estimated 30 percent are women and children. On the mountain above La Rinconada, men disappear into the mines, while their wives sit near piles of discarded rock, swinging four-pound mallets in a syncopated rhythm. With no child care at home and a need for extra income, the women in their long traditional skirts and bowler hats sometimes bring their children along. It is the uncertainty of the mines' lottery system—and the perfidy of many men here—that compels the women to come to the mountain. At least they know that the six or eight grams of gold they find each month, worth about \$200, will go to the family—not to the dingy bars and brothels that line the town's red-light district.

Only gold, that object of desire and destruction, could have conjured up a place of such startling contradictions as La Rinconada. Remote and inhospitable—at 17,000 feet, even oxygen is in short supply—the town is, nevertheless, growing at a furious pace. Approaching the settlement from across the high plains, a visitor first sees the glint of rooftops under a magnificent glacier draped like a wedding veil across the mountain. Then comes the stench. It's not just the garbage dumped down the slope, but the human and industrial waste that clogs the settlement's streets. For all its growth—the number of mines perforating the glacier has jumped in six years from 50 to around 250—La Rinconada has few basic services: no plumbing, no sanitation, no pollution control, no postal service, not even a police station. The nearest one, with a handful of cops, is an hour down the mountain. This is a place that operates, quite literally, above the law.

La Rinconada's frenzied expansion has been fueled by the convergence of rising gold prices and, in 2002, the arrival of electricity. Miners use pneumatic drills now with their hammers and chisels. Traditional leg-driven rock grinders have given way to small electric mills. Electricity hasn't made mining any cleaner; if anything, mercury and other toxic materials are being released into the environment more rapidly than ever before. But nearly everyone agrees

that La Rinconada has never produced so much gold. Estimates vary from two to ten tons a year, worth between \$60 million and \$300 million. Nobody really knows, though, because much of the gold here, strictly speaking, doesn't exist.

Peru's ministry of energy and mines assiduously tracks the gold the country produces, and with good reason: Gold is Peru's top export, and the country is now the world's fifth largest gold producer. Output, at 187.5 tons, is more than eightfold what it was in 1992. The ministry has no office in La Rinconada, however, and locals say the gold coming out of the mines is not accurately counted, in part because mine operators routinely underreport their production figures to avoid taxes. "We're all bankrupt!" laughs one. "Or at least we say we are."

A portion of the unprocessed ore also vanishes. At one gold shop in town, a 19-year-old miner named Leo cheerfully admits that the 1.9 grams of gold he is trading for cash came from rocks that he pilfered from a warehouse his father ostensibly guards. "We do this four or five times a week and split the profits," says Leo. "Nobody notices the rocks are missing."

Many miners at La Rinconada don't officially exist, either. There are no payrolls—just those bags of rocks—and some mine operators don't even bother writing down workers' names. Bosses, of course, can get rich on this kind of indentured servitude. The manager of one of La Rinconada's larger operations says his mine yields 50 kilos (110 pounds) every three months—more than \$5 million worth of gold each year. His workers, on their monthly *cachorro*, each pull in an average of about ten grams (two-tenths of a pound) of gold, or around \$3,000 a year. Despite the disparity, the miners do not rebel against the system; in fact, they seem to prefer the slim chance of winning big once a month in the mines to the dull certainty of low wages and chronic poverty in the fields. "It's a cruel lottery," says Juan Apaza, the gold-toothed miner up on the glacier. "But at least it gives us hope."

The more unforgiving lottery may be the one miners and their families face just trying to survive in such a dangerous and despoiled place. Life expectancy in La Rinconada is a mere 50 years, 21 years fewer than the national average. Fatal mine accidents are common, often caused by crude explosives handled by inexperienced

or inebriated miners. If the blast doesn't kill, the carbon monoxide fumes may. Peru has strict laws governing mine safety, but there's little oversight in La Rinconada. "Of the 200 mining companies here, only five make a full set of safety equipment obligatory," says Andrés Paniura Quispe, a safety engineer who works with one of the few companies that maintains high standards but still requires miners to buy their own equipment.

Miners cope with the drumbeat of death with a reflexive fatalism. The local saying—"Al labor me voy, no sé si volveré"—translates as "Off to work I go, I don't know if I'll make it back." A death in the mine, in fact, is considered a good omen for those left behind. Human sacrifices, practiced in the Andes for centuries, are still considered the highest form of offering to the mountain deity. According to local beliefs, the chemical process by which the mountain absorbs a human brain brings gold ore closer to the surface, making it easier to extract.

But the gods surely can't be happy with how poisoned La Rinconada's environment has become. The raw sewage and garbage on the overcrowded streets are minor nuisances compared with the tons of mercury released during the process of separating gold from rock. In small-scale gold mining, UNIDO estimates, two to five grams of mercury are released into the environment for every gram of gold recovered—a staggering statistic, given that mercury poisoning can cause severe damage to the nervous system and all major organs. According to Peruvian environmentalists, the mercury released at La Rinconada and the nearby mining town of Ananea is contaminating rivers and lakes down to the coast of Lake Titicaca, more than a hundred miles away.

Residents around La Rinconada suffer the brunt of the destruction. Rosemery's father, Esteban Sánchez Mamani, has worked here for 20 years, though he rarely enters the mines these days because of a chronic illness that has sapped his energy and raised his blood pressure. Sánchez isn't sure what the ailment is—his lone visit to the doctor was inconclusive—but he suspects it originated in the polluted environment. "I know the mines have taken years away from me," says Sánchez, whose hunched frame makes him seem decades older than his 40 years. "But this is the only life we know."

**In Chennai, Dilli Bai (at right) joins other sweepers who pan for flecks from neighborhood jewelry workshops, prospecting at dawn, before official trash collectors arrive. Bai collects about a gram a week from the dust of the city streets. Wherever there is gold, people will seek it.**



The family's fate now depends on the ore that Sánchez's wife, Carmen, hauls down from the mountain. Sitting on the floor of the family's stone hut, Sánchez spends most of his days pounding the rock into smaller pieces, keeping the gold-flecked shards in a blue coffee cup. Rosemery does her homework on a sack of rice, peppering a visitor with questions about life outside La Rinconada: "Do you chew coca leaves in your country? Do you own alpaca?" Though just a first grader, she has decided that she'd like to be an accountant and live in the U.S. "I want to go far from here," she says.

Rosemery tags along as her father delivers two sacks of ore—the weekly haul—to the tiny mill above their home. This is part of the endless routine, but each time Sánchez can't help



hoping he's hit the jackpot. At the very least, he hopes there is enough gold to keep his two children in school. "I want them to study so they can leave this place," says Sánchez, who never completed the seventh grade.

Together, father and daughter watch the miller perform his ancient art. Using his bare hands, the man swirls several pounds of liquid mercury into a wooden pan to separate the gold from the rock, dumping the mercury-tainted waste into a stream beneath the shed. Thirty feet downstream a young girl is filling up a plastic bottle in the rancid water. But inside the miller's shed all eyes are focused on the marble-size silvery nugget the miller produces: its mercury-coated exterior hides an unknown quantity of gold.

Stuffing the nugget into his pocket, Sánchez

trudges up the hill to a gold-buying shop. The merchant, one of several hundred in town, burns off the mercury with a blowtorch, releasing the toxic gas through an exhaust pipe into the cold, thin air. As the merchant works, Sánchez paces the room, his frayed gray cap in hand.

After ten minutes, a tiny kernel of gold emerges from the flame. Sánchez frowns. It weighs only 1.1 grams, about one-thirtieth of an ounce. The merchant peels off a few bills and, with a shrug of his shoulders, hands Sánchez a sum that, once the miller's fee is deducted, leaves the family with less than \$20.

"Better luck next time," the merchant says.

Maybe next month, or the next. Eking out a living sky-high on a glacier, Sánchez knows that luck is all he can ever hope for. □



*In the eastern part of Russia, the land still rolls with the pyramidal forms that created the Kamchatka Peninsula, where 11,552-foot Krenitzky Yalovaya towers above nearby peaks, sunlit forest, and farms.*



# Let It Be.

RUSSIA'S KRONOTSKY RESERVE IS BEST LEFT  
UNTOUCHED, IN SPLENDID ISOLATION.





*As summer's exuberance fades, sunset colors steal across tundra dimpled with ponds in Uzon Caldera. Tourists may visit this basin and the nearby Valley of Geysers on a few carefully planned paths—the only public access to the 2.8-million-acre reserve.*

BY DAVID QUAMMEN

PHOTOGRAPHS BY MICHAEL MELFORD

## SOME PLACES ON THIS PLANET ARE SO WONDROUS, AND SO FRANGIBLE, THAT MAYBE WE JUST SHOULDN'T GO THERE.

Maybe we should leave them alone and appreciate them from afar. Send a delegated observer who will absorb much, walk lightly, and report back as Neil Armstrong did from the moon—and let the rest of us stay home. That paradox applies to Kronotsky Zapovednik, a remote nature reserve on the east side of Russia's Kamchatka Peninsula, along the Pacific coast a thousand miles north of Japan. It's a splendorous landscape, dynamic and rich, tumultuous and delicate, encompassing 2.8 million acres of volcanic mountains and forest and tundra and river bottoms as well as more than 700 brown bears, thickets of Siberian dwarf pine (with edible nuts for the bears) and relict "graceful" fir (*Abies sachalinensis*) left in the wake of Pleistocene glaciers, a major rookery of Steller sea lions on the coast, a population of kokanee salmon in Kronotskoye Lake, along with sea-run salmon and steelhead in the rivers, eagles and gyrfalcons and wolverines and many other species—terrain altogether too good to be a mere destination. With so much to offer, so much at stake, so much that can be quickly damaged but (because of the high latitudes, the slow growth of plants, the intricacies of its geothermal underpinnings, the specialness of its ecosystems, the delicacy

of its topographic repose) not quickly repaired, does Kronotsky need people, even as visitors? I raise this question, acutely aware that it may sound hypocritical, or anyway inconsistent, given that I've recently left my own boot prints in Kronotsky's yielding crust.

The government of Russia recognizes such spectacular fragility with that categorical *zapovednik*, connoting roughly this: "a restricted zone, set aside for the study and protection of flora and fauna and geology; tourism limited or forbidden; thanks for your interest, but go away." It's a farsighted sort of statutory designation, bravely and judiciously antidemocratic in a country where antidemocracy has a long, brutal history. Scientists are permitted to enter *zapovedniks*, though only for research and under stringent conditions. Kronotsky is one of 101 such reserves in Russia, by the latest count, and was among the first, decreed in 1934. Before that it had been a sable refuge, established in 1882 at the prompting of local people, hunters and trappers who valued the forests surrounding Kronotskoye Lake as prime habitat for *Martes zibellina*, the sable. The Kamchatka Peninsula is very distant from Moscow (as distant, in fact, as Moscow is from Boston), and to Joseph Stalin's

*A skittering bird and a lumbering brown bear left prints in the mud at a hot spring in Uzon Caldera. Among the largest of their family worldwide, brown bears can grow to over 1,200 pounds. More than 700 thrive in the reserve.*





Soviet government in the mid-1930s (with much else on its agenda) the opportunity costs of putting a modest chunk of that wilderness within protective boundaries probably didn't seem high. In 1941 a second kind of asset revealed itself within the reserve, when a hydrologist named Tatiana I. Ustinova discovered geysers there.

In the cold springtime of that year, Ustinova and her guide were exploring the headwaters of the Shumnaya River by dogsled. They paused near a confluence point and happened to notice, at some distance along the water's edge, a large outburst of steam. With hungry dogs and other

urgencies pulling her away, Ustinova wasn't able to see much more, not then, but she returned several months later to map and study what proved to be a whole complex of geothermal features, including about 40 geysers. She named her first geyser Pervenets, meaning "first-born." The tributary she

ascended is now called the Geysernaya River, and above one of its bends is a slope known as Vitrazh, or stained glass, for its multicolored residue from a score of large and small vents. Kronotsky's Dolina Geysеров (Valley of Geysers) took its place as one of the world's major geyser areas, in a league with Yellowstone, El Tatio in Chile, Waiotapu on New Zealand's North Island, and Iceland.

Geysers are generally associated with volcanic activity, and that's certainly the case in Kronotsky. Kamchatka as a whole is abundantly pustulated with volcanoes, of which about two dozen, including some inactive ones, lie within the zapovednik or along its borders. Kronotsky Volcano is the tallest, a perfect cone rising to 11,552 feet. Krashennnikov Volcano (named for Stepan Petrovich Krashennnikov, a hardy naturalist who explored Kamchatka in the early 18th century) is its nonidentical twin, lying just southwestward across the Kronotskaya River. Still farther southwest is what would be, but no longer is, the third in a huge three-peak sequence. Instead of a high cone, it's a broad,

low bowl, up to eight miles in diameter, filled with fumaroles and hot springs and sulfurous lakes, blueberry-and-heather tundra, forest patches of birch and Siberian dwarf pine, all rimmed by a circular ridge left behind when a vast volcano blasted itself open about 40,000 years ago. The bowl is called Uzon Caldera. Its name comes from the kindly spirit Uzon, a powerful figure in the legends of the native Koryak people. The exploration and study of Uzon Caldera by scientists, as well as Ustinova's finding of the Valley of Geysers, gave additional purpose to the zapovednik: protecting

geological wonders as well as biological ones.

The story told by Koryaks about Uzon and his caldera has the ring of a parable. He was a friend to humanity, quieting earth tremors, stifling volcanic eruptions with his hands, doing other good deeds; but he endured a lonely existence, living

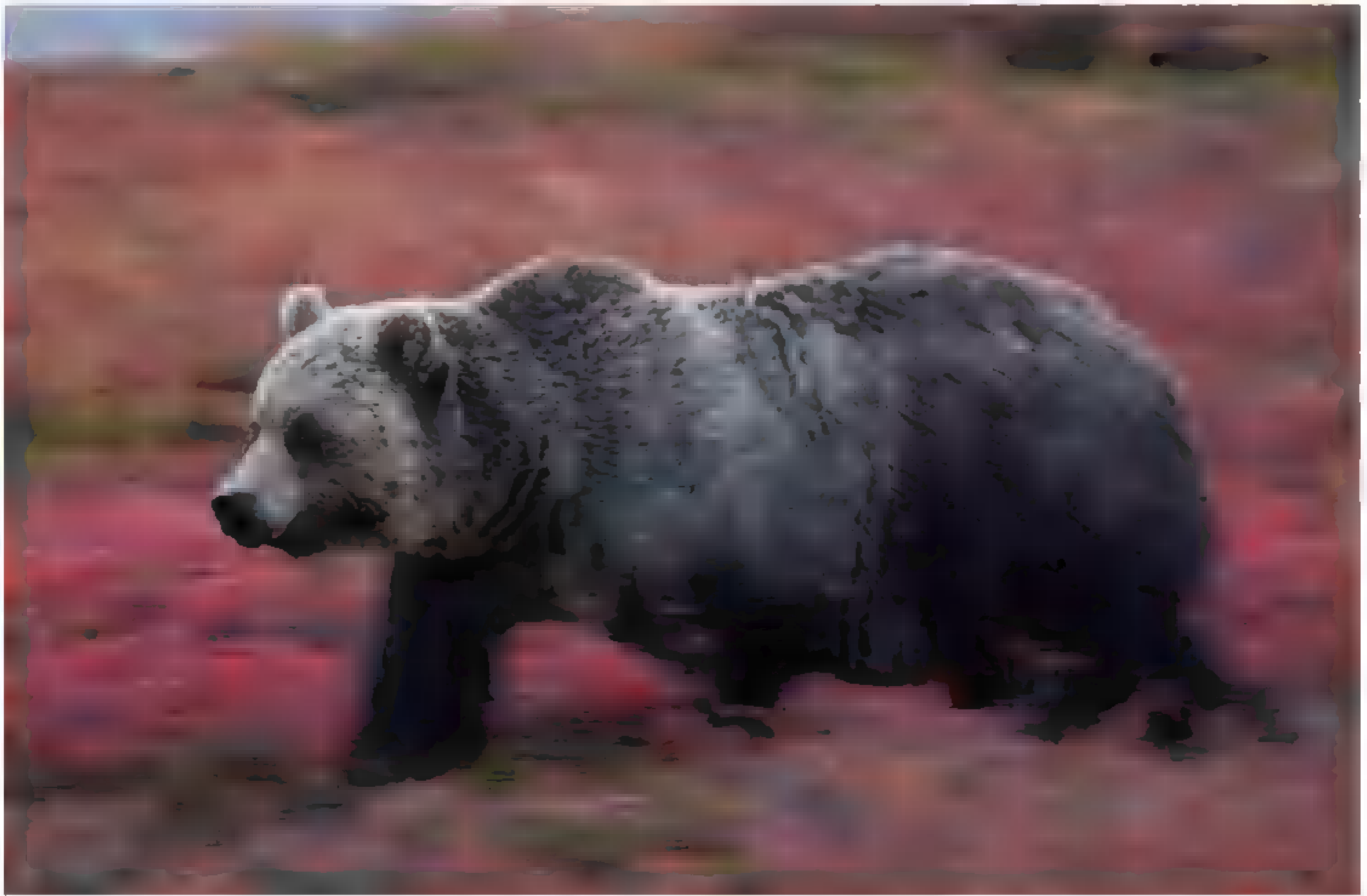
IT'S A  
SPLENDOROUS  
LANDSCAPE,  
DYNAMIC AND RICH,  
TUMULTUOUS AND  
DELICATE, TOO  
GOOD TO BE A MERE  
DESTINATION.

secretively atop his own mountain so that evil spirits wouldn't come and destroy the place. Then he fell in love. She was a human—a beautiful girl named Nayun, with eyes like stars, lips like cranberries, eyebrows as dark and glossy as two sables. She loved Uzon in return, and he took her away to his mountain. So far, so good. But after some years of marital bliss and isolation, Nayun began to pine for her human relatives. Couldn't she have a visit with them somehow? Uzon, wanting to please her, made a desperate and tragic mistake: He spread the mountains with his mighty arms and created a road. People came, curious and disruptive. Now everybody knew Uzon's secret hideaway, including those evil spirits. "The earth yawned with a horrible crash having absorbed a huge mountain," in one telling of this tale, by G. A. Karpov, "and mighty Uzon turned into stone forever." You can see him there even today, petrified into a high peak on the northwestern perimeter of the caldera, his head bowed, his arms stretched around to form the rim.

IF YOU DO SEE HIM, you'll be among the few. The ban against tourism has been relaxed, but not much, for Kronotsky. About 3,000 nonscientific visitors now enter each year,

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*David Quammen holds the Wallace Stegner Chair at Montana State University. Frequent contributor Michael Melford specializes in landscape photography.*



*Racing to pack on pounds before winter grips the reserve, a brown bear hunts for fruit in a blueberry patch reddened by September's chill. Traveling to favorite spots for catching salmon, generations of bears have worn a path along a river bend (below). Coho, chum, chinook, and humpback salmon all spawn in the reserve's clear-running rivers.*



and of those, only half make a stop in Uzon Caldera. Regulations limit the number, but so do logistics, lack of infrastructure, and cost. For starters, there is no road into Kronotsky Zapovednik from the more settled parts (which are not very settled) of Kamchatka. No roads within the reserve either, notwithstanding the legend of Uzon. The in-and-out transport consists mainly of Mi-8 helicopters, thunderously powerful machines such as once ferried troops for the Soviet Army. Sitting in an Mi-8 as it powers up for takeoff, strapped into a rickety seat beside a porthole window, you feel as you would in a crowded school bus with a sizable sawmill bolted to its roof—until the whole thing levitates. Tourist flights leave from a heliport 20 miles from Petropavlovsk, Kamchatka's capital, and are permitted to land only on helipads in the caldera and the Valley of Geysers. Neither place offers over-

night accommodation for tourists, so a visit to the reserve constitutes a very pricey (\$700) day trip with lunch. The customer traffic seems mostly made up of wealthy Russians, Europeans on adventuresome holidays, and the occasional American. Five hours in Kronotsky isn't something that ordinary families in Petropavlovsk could normally afford; it's not like loading the kids into the van for a summer trip that includes an ice cream cone at Old Faithful. Chopping in to see geysers and volcanoes and maybe a few brown bears (fleeing across the tundra as your pilot hazes them at low elevation to provide a good look) is nature appreciation for the affluent, sedentary elite. It's dramatic and thrilling and privileged and rude. It makes me dyspeptic, but...how would I know that if I hadn't been there and done it myself?

The authorities who manage Kronotsky and the scientists who study it are sensitive to the downside of such tourism. Everybody leaves a footprint of some sort, the crucial questions being how deep and how many. At the beginning and the end of each summer season, investigators

look for impacts at the caldera and the geysers. Their report helps inform decisions about the next season's visitation limits and dates. But the greater conundrum of Kronotsky, the one that provokes thought and not just sour belly, is how the concern over human-caused degradation should be reconciled with the inherent, violent dynamism of the place. This conundrum came to a point on June 3, 2007, when a massive wall of rock, mud, clay, and sand broke loose from a high ridge and slid, roaring, down a small creek valley, obliterating a hundred-foot waterfall, damming the Geysernaya River (all in a matter of seconds), and burying much of the Valley of Geysers beneath the resulting new lake. George Patton's army, marching through in hob-nailed boots, couldn't have made such a mess.

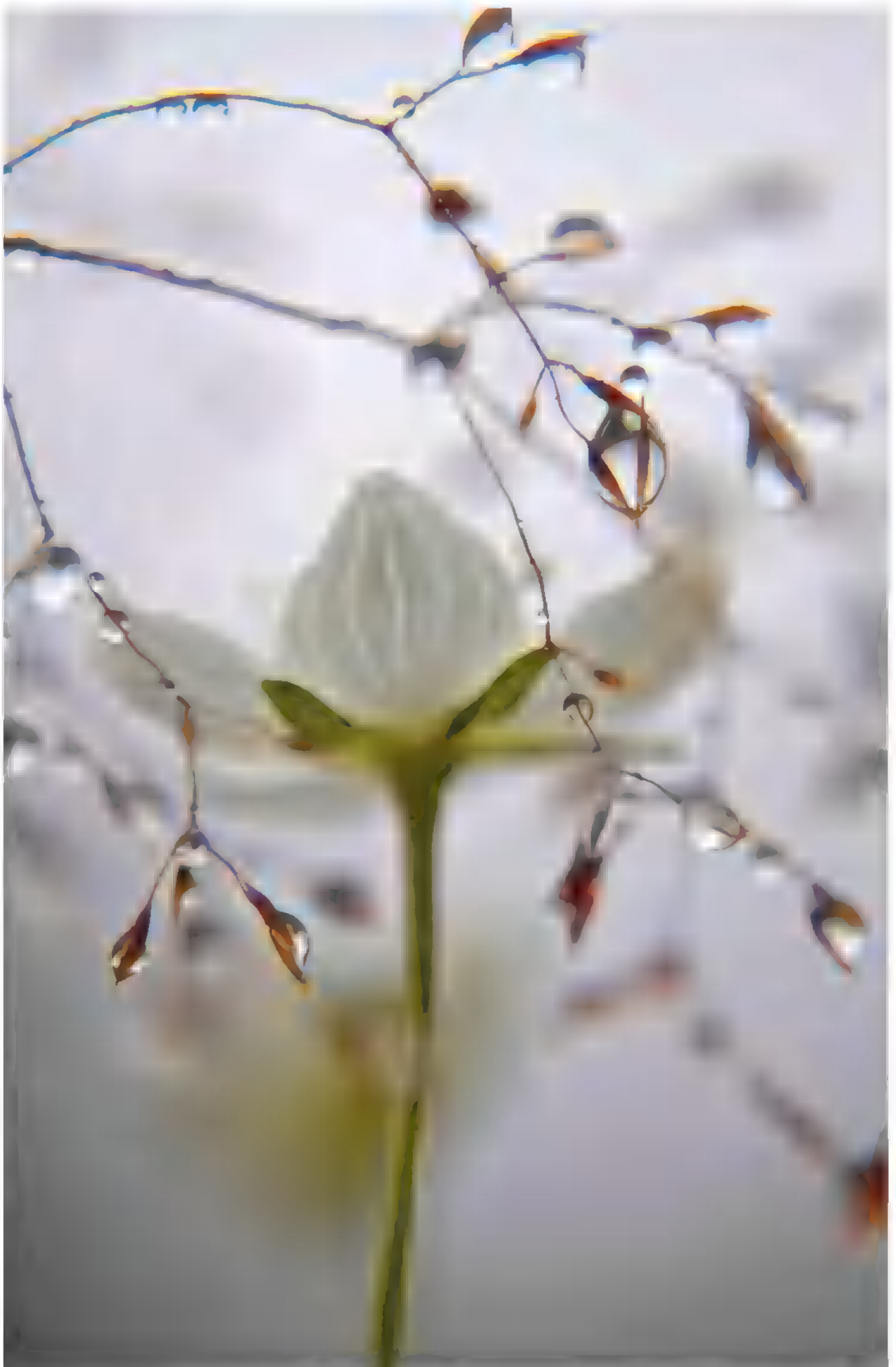
Pervenets, Ustinova's first-born geyser, is gone. So are a few other famous spouts. The

rest remain. Vitrazh, the stained-glass mosaic, is intact. Alarming reports reached the international press, vacations were canceled, and people immediately disagreed about whether the slide was a tragedy or simply a fascinating natural shrug. "We scientists believe we are quite lucky to witness such an event," according to Alexander Petrovich Nikanorov, a researcher who briefed me at the zapovednik headquarters near Petropavlovsk. "Our lives are very short, and yet we witnessed it."

Geologists have good reason to feel that their lives, relative to the phenomena they study, are short. Rock usually moves slowly through time. But of course it's true for the rest of us also: Life is short, the world is big, and we're lucky to witness as much as we can. Whether that means we should all climb aboard the helicopter is another question, which I can't answer, not even to my own satisfaction. What I can tell you (and what Michael Melford's photographs show you) is this: Kronotsky Zapovednik is an extraordinary place, fragile and magnificent and changeable. Maybe you can take that on faith? □

THE WORLD IS BIG,  
AND WE'RE LUCKY  
TO WITNESS AS MUCH  
AS WE CAN. WHETHER  
OR NOT WE SHOULD  
ALL CLIMB ON  
THAT HELICOPTER,  
I CAN'T ANSWER.

*Pearls of mist frame a bog star in a river-edge meadow, one of more than 750 plant species found in the reserve. Collecting is prohibited here, but in other parts of Russia, folk medicine prescribes infusions of bog star for intestinal illnesses.*





## LAND OF FIRE AND ICE

Established to protect saibals from overhunting, the Kronotsky Nature Reserve stretches along the east coast of the Kamchatka Peninsula. Here the Pacific tectonic plate grinds beneath Asia, forming a string of volcanoes and smoldering valleys. This rugged, primeval landscape—subject to long, bitter winters—is officially open only to scientists and a limited number of tourists. Each year some 3,000 visitors, both Russian and foreign, pay \$700 each to be flown in by helicopter for a day of spectacular sightseeing.

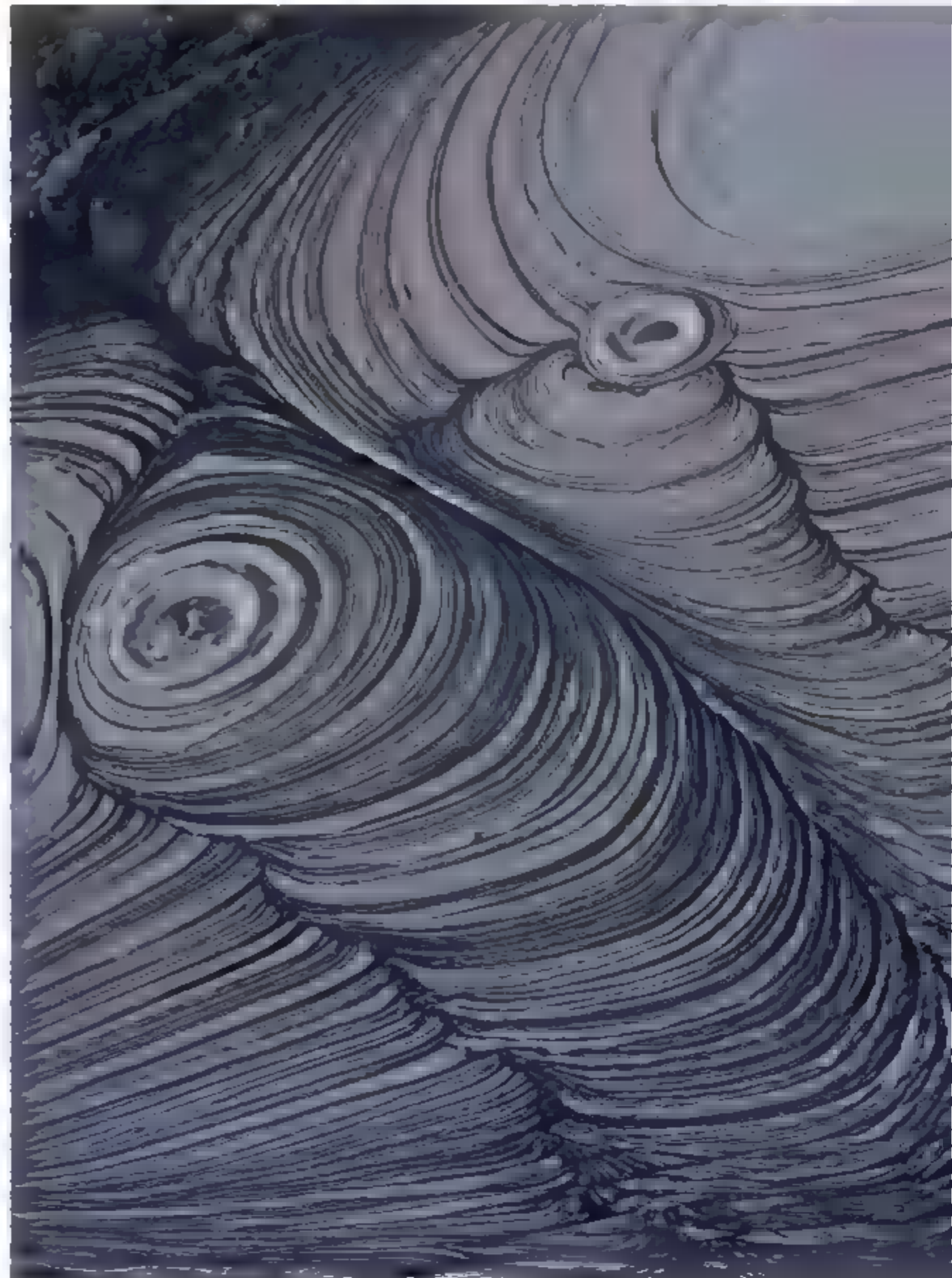
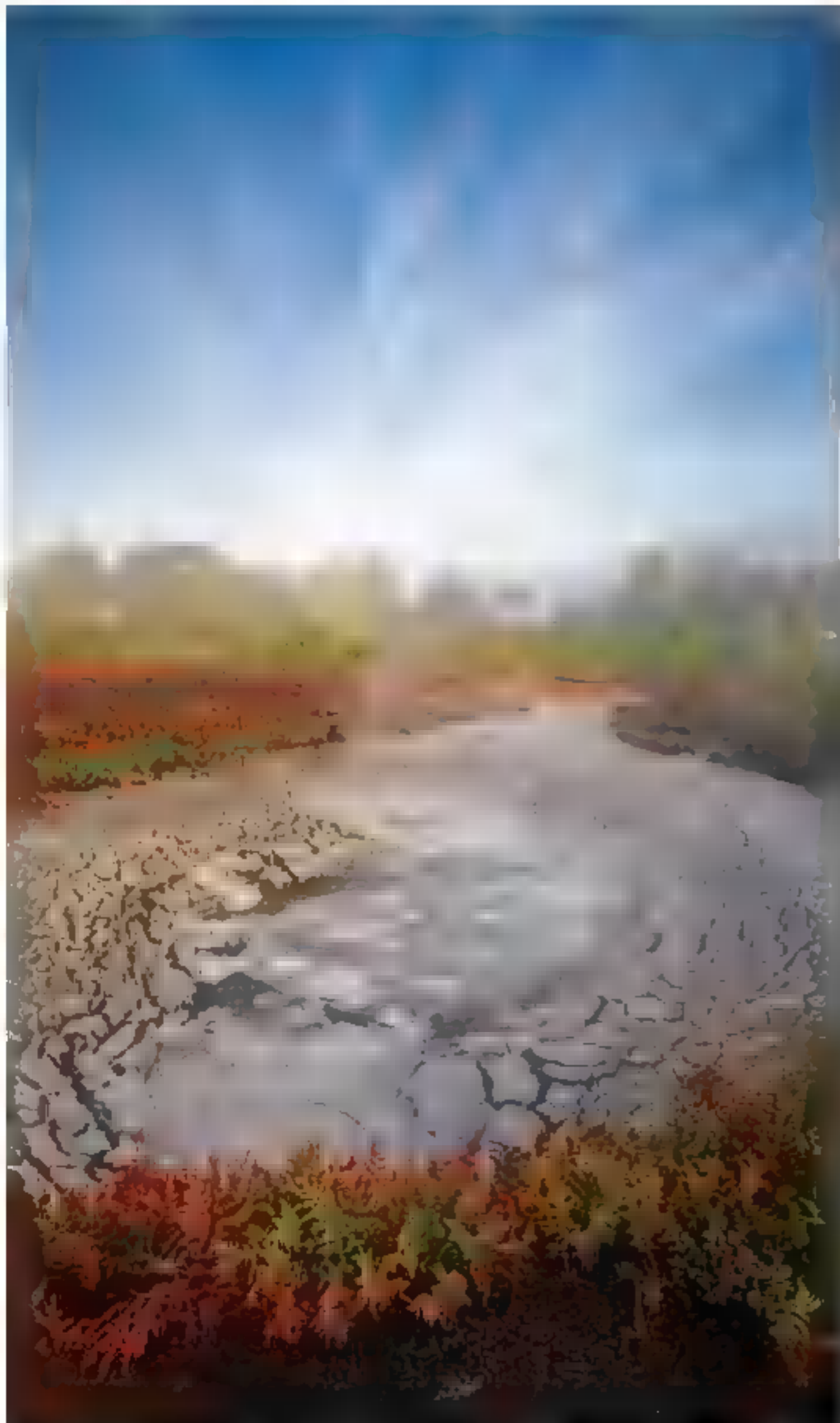
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MARTIN GAMACHE, NG STAFF  
SOURCE: KEVIN MACKAY, MICHIGAN STATE UNIVERSITY





*Whipped into shape by winds gusting over snowcapped Kronotsky Volcano, stacked lenticular clouds blush in the last light of day. Among the world's most perfectly cone-shaped peaks, the mountain last erupted in 1923.*



*Bronzed in fall, ferns that surround a steaming mud pot in Uzon Caldera risk a scorching from spatter. Come spring, though, they'll get an early start at growing as the heat quickly melts away winter's thick cover of snow.*





*In another Uzon Caldera mud pot, a slurry of volcanic earth and superheated water burbles in endlessly changing patterns. Up to eight miles wide, Uzon simmers and hisses with over 500 geothermal features, including hot springs and steam vents.*





*Rolling off Kronotsky Volcano, an autumn storm billows toward the tundra. This vast tundra of feathery grasses, red bearberries, and green crowberries attracts grazing reindeer, berry-picking bears, and curlews that swoop in by the thousands to strip the bushes of their fruit.*





*Day breaks over a landscape that evokes the dawn of Earth itself, illuminating steam that seethes between ridges at the base of Mount Zubchatka, named for its jagged appearance. Such beauty is transcendent but vulnerable.*



# LAST ONE

*In the United States as elsewhere, stopping the countdown to extinction means preserving healthy habitat—the aim of the celebrated and scorned Endangered Species Act.*

*Photographs by Joel Sartore*

Ocelots are gone from all U.S. states except Texas, driven by human development. The ocelots still roam the subtropics of South America, but there's little reliable data on their true numbers.

195

ESTIMATED U.S. POPULATION: LESSER THAN 100 MILL, 26 BIRTHS



After slipping into extinction almost unnoticed, the dusky seaside sparrow—found mainly on Florida's Merritt Island—declined from some 3,000 pairs to none as its salt marsh habitat was sprayed with DDT and taken over for use by the space program. The last dusky died in 1957.



DUSKY SEASIDE SPARROW







O

*Bryn the pygmy rabbit died in 2008, months after this photograph was made. Though her species survives, the genetically distinct Columbia Basin population to which she belonged does not. Responsible for its downturn: conversion of sagebrush habitat to agriculture. Conservationists hope a breeding program will salvage part of the genome.*

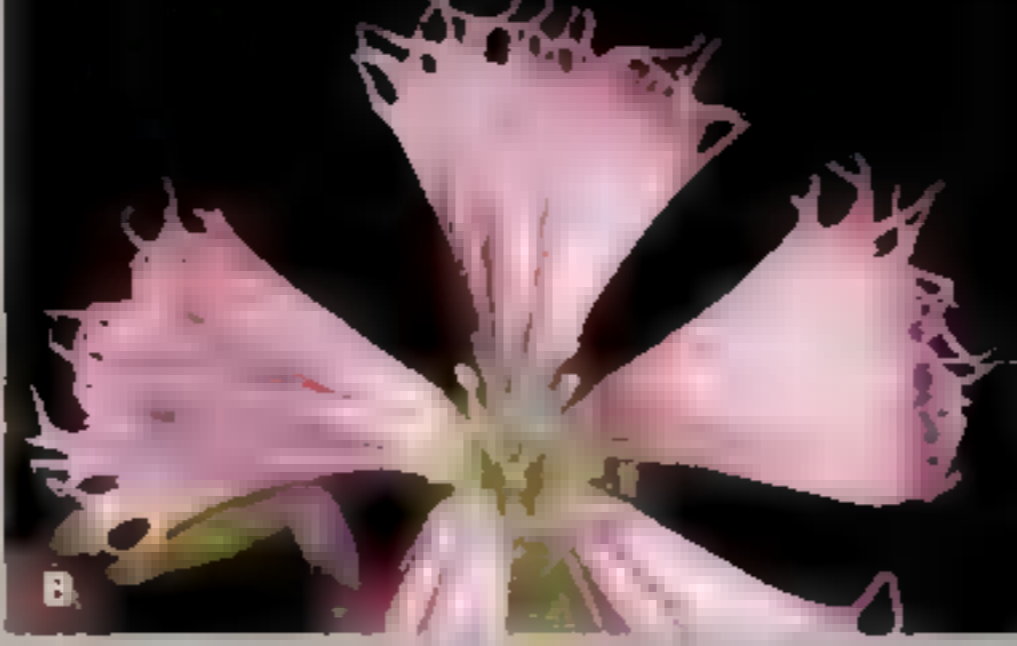
**PYGMY RABBIT**

2,400



A

10,700



B

700



C

572



E

50,000



F

90,000



G

4,100



I

1,000



J

2,100



K

12,210



M

5,000



Q

5,800



N

300

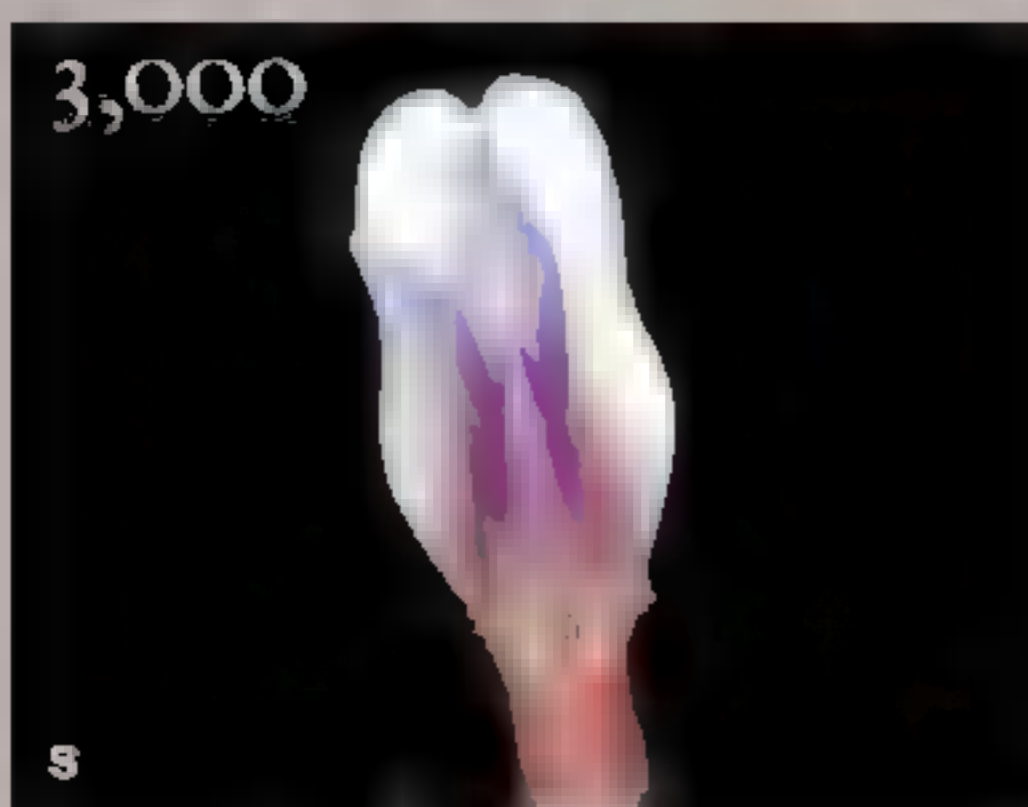
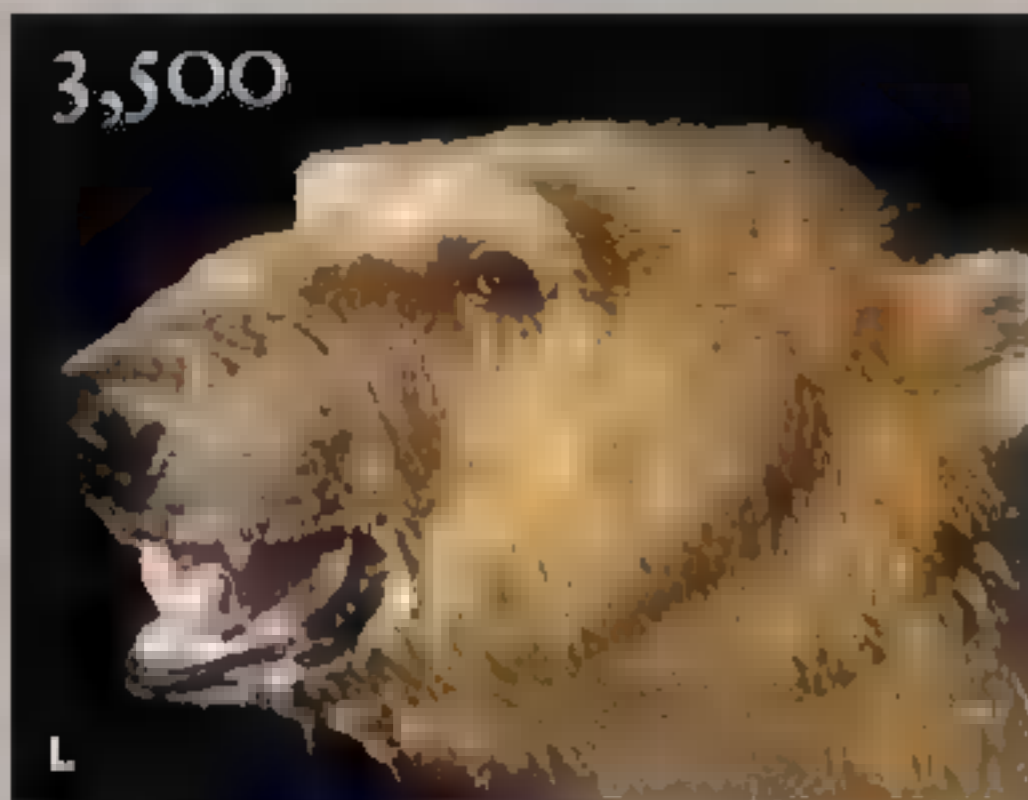
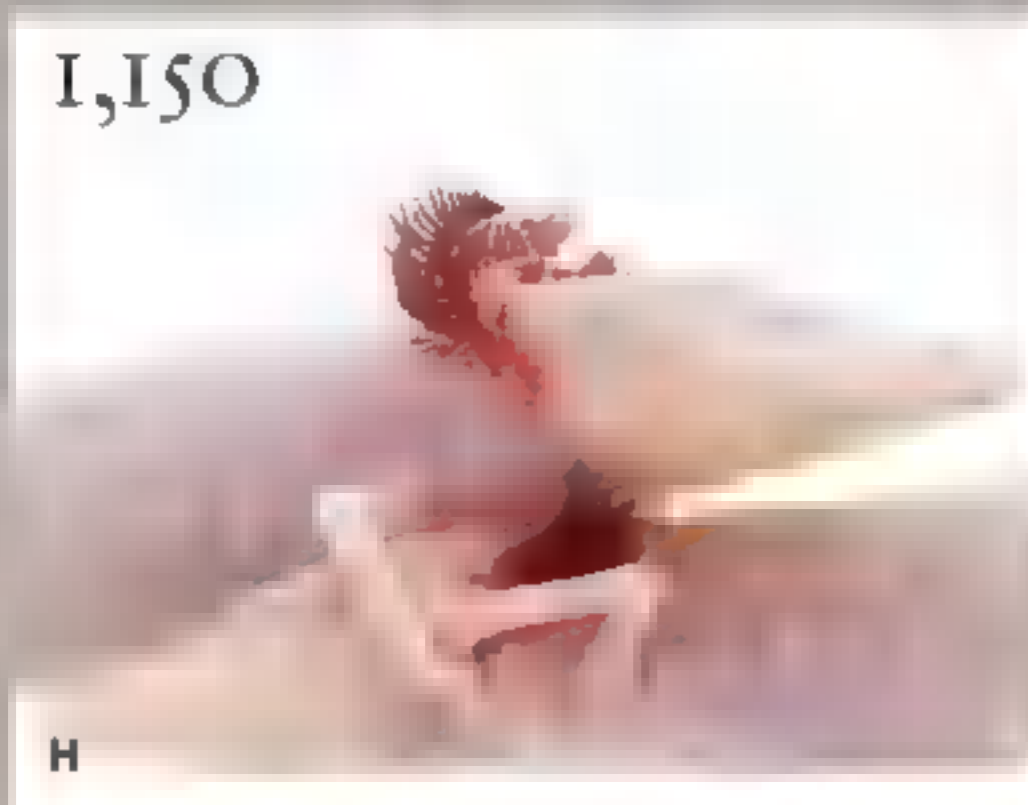
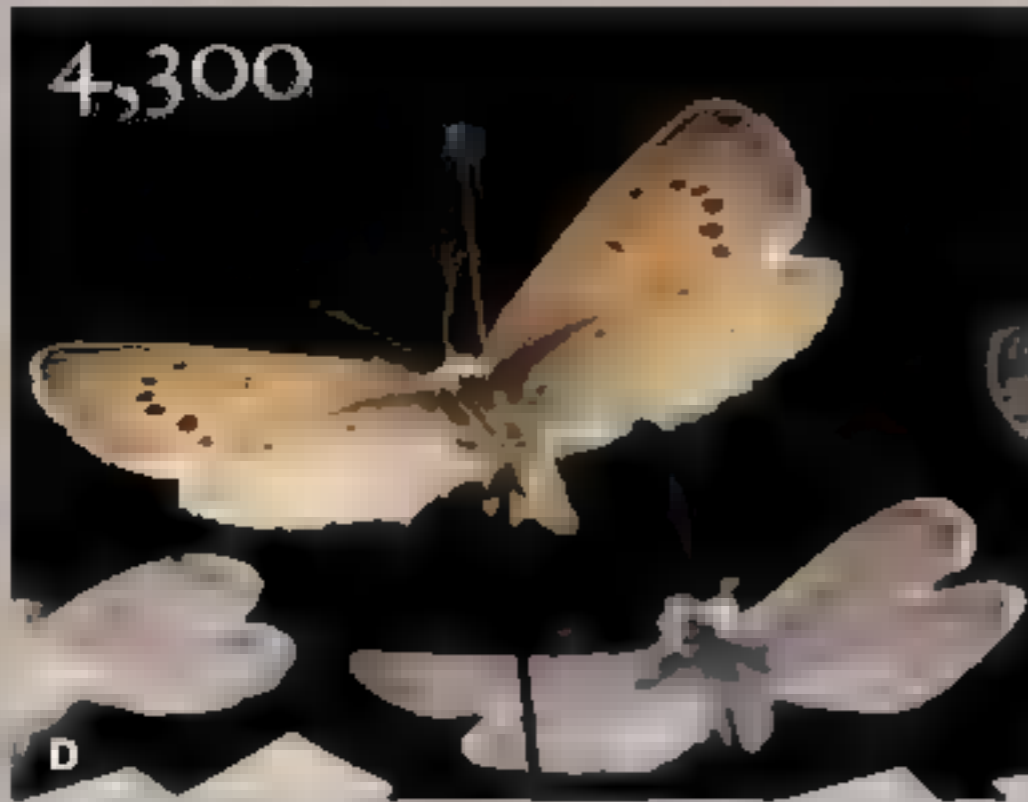


P

300



R



**PUERTO RICAN CRESTED TOAD** *Peltophryne lemur*; photographed at Sedgwick County Zoo, Wichita, Kansas  
ESTIMATED 500 TO 2,000 WILD AND 400 CAPTIVE

**FRINGED CAMPION** *Silene polypetala*; U.S. Fish and Wildlife Service, Athens, Georgia  
ESTIMATED 5,500 TO 10,700 PATCHES

**MASKED BOBWHITE** *Colinus virginianus ridgwayi*; Phoenix Zoo, Arizona  
NEARLY EXTINCT ■ THE WILD. SOME 700 CAPTIVE

**PALOS VERDES BLUE BUTTERFLY** *Glaucopsyche lygdamus palosverdesensis*; Florida Museum of Natural History, Gainesville  
ESTIMATED 300 WILD AND 4,000 CAPTIVE

**SANTA CATALINA ISLAND FOX** *Urocyon littoralis catalinae*; Middle Ranch Veterinary Field Clinic, Santa Catalina, California

**YELLOW-BLOTCHED MAP TURTLE** *Graptemys flavimaculata*; Tennessee Aquarium  
ESTIMATED 50,000

**LOGGERHEAD SEA TURTLE** *Caretta caretta*; Riverbanks Zoo, Columbia, South Carolina  
BIOLOGISTS TALLY NESTS, NOT INDIVIDUALS. SOME 47,000 TO 90,000 NESTS WERE COUNTED EACH YEAR ON THE ATLANTIC COAST OVER THE PAST DECADE

**TEXAS BLIND SALAMANDER** *Eurycea rathbuni*; Detroit Zoological Society, Michigan  
150 CAPTIVE, ESTIMATED 100 TO 1,000 WILD

**BOULDER DARTER** *Etheostoma wapiti*; Conservation Fisheries, Knoxville, Tennessee  
ESTIMATED 3,500 WILD AND 600 CAPTIVE

**DELHI SANDS FLOWER-LOVING FLY** *Rhaphiomidas terminatus abdominalis*; Colton, California  
FEWER THAN 1,000

**HAWAIIAN GOOSE** *Branta sandvicensis*; Great Plains Zoo, Sioux Falls, South Dakota  
ESTIMATED 2,000 WILD AND 100 CAPTIVE

**POLAR BEAR** *Ursus maritimus*; Tulsa Zoo, Oklahoma  
ESTIMATED 3,500 IN ALASKA

**RED-COCKADED WOODPECKER** *Picoides borealis*; North Carolina Zoo  
ESTIMATED 12,210 BREEDING BIRDS

**YELLOWFIN MADTOM** *Noturus flavipinnis*; Conservation Fisheries, Knoxville, Tennessee  
ESTIMATED 5,000 WILD AND 800 CAPTIVE

**MEXICAN SPOTTED OWL** *Strix occidentalis lucida*; Wildlife Center, Española, New Mexico  
ESTIMATED 1,000 TO 2,000

**WOLVERINE** *Gulo gulo*; New York State Zoo at Thompson Park  
THOUGH NOT OFFICIALLY LISTED. SOME 300 WOLVERINES REMAIN IN THE LOWER 48 STATES.

**CHIRICAHUA LEOPARD FROG** *Lithobates chiricahuensis*; Phoenix Zoo, Arizona  
ESTIMATED 5,000 ADULTS

**MOUNT GRAHAM RED SQUIRREL** *Tamiasciurus hudsonicus grahamensis*; Arizona-Sonora Desert Museum

**PYNE'S GROUND-PLUM** *Astragalus bibullatus*; Flat Rock Cedar Glades and Barrens State Natural Area, Tennessee  
ESTIMATED 2,500 TO 3,000 PLANTS

# THE SPARROWS OF MERRITT ISLAND ARE NO MORE.

The final resting place of the last dusky seaside sparrow is a glass bottle in the Ornithology Collection at the Florida Museum of Natural History. The bird's eyes are heavily mantled, and its feathers have been ruffled by the alcohol that nearly fills the bottle. A paper tag states that the bird, an old male, died on June 16, 1987. Three and a half years after that sparrow's death, a terse entry appeared in the Federal Register announcing that the dusky seaside sparrow was now extinct and had been removed from the federal government's list of endangered and threatened wildlife. Neither the bird nor its critical habitat—the salt marshes of Florida's Merritt

Island, which is also the home of the John F. Kennedy Space Center—would be protected any longer by the Endangered Species Act.

What killed the sparrows of Merritt Island? In a word, improvements. No one ate the dusky seaside sparrow or hunted it for sport. Its nests weren't vandalized, nor was it suddenly preyed upon by a newly introduced predator. But by spraying with DDT to control mosquitoes and building impoundments that allowed freshwater vegetation to take over the salt marshes, humans adjusted the ecosystem—hoping to improve their own lives—and discovered, too late, how finely attuned to its home in the cordgrass the dusky seaside sparrow really was. That last bottled sparrow is what a species looks like when its habitat has vanished for good.

For 35 years, ever since Richard Nixon signed it into law in December 1973, the Endangered Species Act has served as a biological halfway house, a kind of protective legal custody for life-forms at risk of disappearing. It would be more accurate, in a way, to call it the Endangered Species and Habitat Act, since the purpose of the law is to protect species by identifying and then protecting their critical habitat—old-growth forest for the northern spotted owl,

the Little Tennessee River for the snail darter. The act has been controversial ever since it was signed, not because it tries to save plants and wildlife but because it tries to save the habitat they need to survive. Usually—and here is where the trouble arises—this means preventing humans from altering those ecosystems in any way.

What passed in 1973 was a lean, tough act. It called upon every department and agency in the federal government to work explicitly toward protecting endangered and threatened species. It required the federal government to cooperate with state governments in doing so, and it pledged the United States to live up to several international treaties whose purpose is to conserve species facing extinction. It was, in a sense, a bill of rights for the rest of creation.

There was a sense of urgency in the act—an urgency it shared with the Clean Air and Clean Water Acts of 1970 and 1972. What inspired them all was a groundswell of environmental awareness rising from many sources—including Rachel Carson's *Silent Spring*, published in 1962—and the sudden, painful realization that many species, whales and whooping cranes alike, were collapsing in numbers.



*Gopher tortoises in the southeastern U.S. often end up as roadkill. Invasive fire ants and armadillos also prey on their eggs and young, while urban expansion, land conversion for pine plantations, and fire mismanagement degrade tortoise habitat, pushing these reptiles closer to the edge.*

Is the urgency any less today? There were nearly 100 million fewer Americans in 1973, and some 2.8 billion fewer people on the planet. Scientists were just beginning to imagine climate change of the order now being projected, and its effect on wildlife and plants. Report after report—on habitat loss, deforestation, the pillaging of ocean fishing stocks, the plummeting of migratory bird populations—clearly indicates that the picture for many species, perhaps most, is far worse now than it was 35 years ago.

And yet in that time, the act has become a battleground. In part this is because it has created an ongoing conflict between the right to manage and develop property as an owner sees fit and the need to protect habitat critical to any endangered species that live on it. There's no mistaking the sober intent of the act. It prohibits the "taking" of any endangered species, and makes it illegal to destroy critical habitat,

even on private land. Some landowners feel this provision violates their legal rights. They've taken their argument all the way to the Supreme Court, and mostly lost. Some landowners who feared the possible impact of the Endangered Species Act have even rushed ahead to exploit their property preemptively—by logging it, for instance—while a species is being considered for listing. To prevent this, and to create a safety valve in the law, the federal government has created programs like Safe Harbor. Participating landowners agree to protect habitat in exchange for assurances that more restrictive limits will not be imposed on their property.

But the act remains on life support. It has not been reauthorized—given multiyear funding—since the late 1980s, subsisting instead on annual appropriations requested by the Interior Department. The Bush Administration has done nearly everything it could to endanger



*The Alabama beach mouse ekes out a living on a 14-mile stretch of the state's Fort Morgan Peninsula, where its dune habitat is fragmented by construction and lit up at night. Habitat saved under the Endangered Species Act (ESA) prevented these nocturnal mice from going the way of the dodo.*

the act itself by decreasing funding and politicizing the scientific evaluations that determine the status of species at risk. As this article goes to press, only 64 species have been listed in the almost eight years George W. Bush has been in the White House. During his father's four years, the total was 235.

There's nothing easy about adding a creature to the list. Sometimes a species is proposed by the Fish and Wildlife Service or the National Marine Fisheries Service. Sometimes it's proposed by the public or a conservation group. A candidate for listing must undergo a scientific review and a public comment period. One of the most recent additions—the polar bear, which was given threatened status last May—

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*Verlyn Klinkenborg chronicles the natural world for many publications. Joel Sartore has photographed 25 Geographic stories, six on endangered species.*

suggests some of the inherent difficulties. Polar bear habitat is dwindling due to climate change, but it's also being compromised by the rush to exploit the Arctic for minerals and petroleum. Dirk Kempthorne, the Secretary of the Interior, listed the polar bear only after being forced to by a federal court, and only after calling the Endangered Species Act “perhaps the least flexible law Congress has ever enacted.” In its waning months the Bush Administration proposed regulatory changes that would gut the act by allowing federal agencies, not scientists, to decide whether to protect a species.

At present 1,050 species in the United States and its neighboring waters are listed as endangered—at risk of extinction. Another 309 are listed as threatened, or likely to become endangered in the foreseeable future. There are recovery plans—strategies for restoring dwindling populations—for most of them, including

measures like acquiring critical nesting beaches for Atlantic loggerhead sea turtles or restoring wetland habitat for the copperbelly water snake. But critical habitat has been designated for only 520 species. And when it comes to actual recovery, the numbers are not encouraging. Since 1973, only 39 U.S. species have been removed from the endangered and threatened list. Nine of those went extinct, and 16 were removed when evidence emerged that a listed species was not, in fact, imperiled. Only 14 have recovered enough to be delisted. Meanwhile, listing is pending for nearly 300 official candidates, everything from Las Vegas buckwheat to the Miami blue butterfly.

Critics say those numbers show how ineffective the Endangered Species Act really is. But the numbers may instead show just how much economic and political inertia the act has faced. And there are other ways to measure its success. How many species might have vanished without it? Perhaps the best measure of the act's value is the very contention it causes, the fact that it gives endangered species a day in court and helps us see the unintended consequences of our actions. It reminds us that what look like simple economic decisions—to build a subdivision or auction new drilling leases or plant more corn for ethanol production—have to be considered within the greater economy of nature, where many lives are in the balance.

Some creatures are so iconic that it's easy to see why we take the trouble to save them. The bald eagle was removed from the list in 2007 because its numbers in the lower 48 states have been successfully restored—from fewer than 500 nesting pairs in 1963 to some 10,000 pairs in 2007. One population of the grizzly bear—in Yellowstone National Park—has graduated from the list. So have such impressive species as the peregrine falcon and the American alligator.

But what about the Delhi Sands flower-loving fly, an inch-long insect that now lives in only a few locations in southern California's Riverside and San Bernardino Counties? Or the 165 remaining Salt Creek tiger beetles, which dwell in a few surviving patches of saline marsh near


Lincoln, Nebraska? What about Mississippi sandhill cranes, which are down to about 25 breeding pairs? Or the once widespread Higgins' eye pearly mussel, whose range has shrunk to a few pools in the Mississippi River and its tributaries? What about a shorebird like the red knot, which is not federally listed but is in steep decline from the overharvesting of its predominant food source, horseshoe crabs?

Most people have never heard of, much less seen, these creatures. They have no immediate appeal except their own intrinsic beauty. They stand for nothing except their own way of life, which has been hindered by development, pollution, or the spread of invasive species.

After 35 years it has become clear that the Endangered Species Act is really a test—and not just to see whether we can do the scientific and bureaucratic and legal legwork quickly enough to make a difference for the thousands of species at risk. The act is a test of priorities—a test the just elected President and his administration will face anew. After all the politically delicate lessons we've learned about protecting species at risk, will the country recommit itself to the task with the directness and the idealism of 1973?

Again and again, the battle over listing a species—giving it the protection of the law—boils down to the choices we make in our ordinary lives. Listing the greater sage grouse, for instance, would hamper natural gas and coal development in Wyoming. But we could offset those losses in production by conserving energy, something we ought to be doing anyway to slow climate change. It seems like a paradox. Adding species to the endangered list takes the concerted effort of scientists, legislators, conservationists, and ordinary citizens. But what saves species, in the end, is human restraint, the ability to balance our needs against the needs of the rest of the lives on this planet.

We have no way of guessing how long our own kind will survive, but one thing is certain. The better the chances of survival for the plants and animals and insects you see in these photographs—and for all their endangered kin—the better our own chances will be. □



*They survived the Ice Age, but condors barely held out against Homo sapiens. Many of these scavengers were shot or poisoned by fragments of lead left behind by hunters. In 1985 just nine wild birds remained. Captive breeding and reduced use of lead ammunition have brought the species back.*

**FOLLOWING PAGES** *American burying beetles like dark, undisturbed areas rich in carrion. Nature's undertakers, they bury dead animals to feed their young. Their range is down from 35 states to 11 numbers are falling too.*





336

156 WILD, 180 CAPTIVE

CALIFORNIA CONDOR



The image features a dense arrangement of American burying beetles against a plain white background. Each beetle has a dark, almost black, body with several bright orange or reddish-orange spots of varying sizes. The beetles are shown from various angles, some facing upwards and others downwards, highlighting their segmented bodies, legs, and antennae. The overall composition is a close-up, artistic representation of these insects.

25,000

ESTIMATES RANGE FROM 2,500 TO 25,000

AMERICAN  
BURYING BEETLE

40

(IN THE LOWER 48 STATES)



WOODLAND CARIBOU

538

387 WILD, 151 CAPTIVE



*Captive breeding, migration training, and the ESA have saved the whooping crane. Still troubling: development along migration routes and reduced genetic diversity from earlier population crashes.*

**LEFT** *Reliant on now scant old-growth forest, woodland caribou are nearly absent from the lower 48 states. Just a few holdouts still cross from Canada into northern Idaho and Washington.*

**WHOOPING CRANE**

**1,500**

IN THE LOWER 48 STATES



**GRIZZLY BEAR**



*Shielded by the ESA, grizzlies are returning to old haunts while conservationists work to reconnect remaining habitat blocks in the northern Rockies. Humans nearly felled these bears: Montana grizzly expert Chris Servheen reckons that between 1920 and 1940 fewer than 300 existed in the lower 48 states.*

# 18,100

ESTIMATES RANGE FROM 14,600 TO 18,100



**BOG TURTLE**



*The palm-size bog turtle, smallest in the country, now survives mostly on private lands. Adapted to soggy soils, the species suffers where wetlands are filled or groundwater is diverted.*

*Still on shaky ground, the Mexican gray wolf, an endangered subspecies, is slowly increasing in number in Arizona and New Mexico thanks to captive breeding.*

320

60 WILD, 260 CAPTIVE

MEXICAN GRAY WOLF

*"The world wouldn't crumble without them," says biologist Sandra Sneckenberger, "but they're indicators of ecosystem health." In faltering numbers, St. Andrew beach mice survive in Florida on dune habitat in public and private hands. If both sides can work together, Sneckenberger says, the mice just might beat the odds.*

**SPECIAL THANKS** SAN DIEGO ZOO (OCELOT, *LEOPARDUS PARDALIS*, PAGES 83-84); FLORIDA MUSEUM OF NATURAL HISTORY (DUSKY SEASIDE SPARROW, *AMMODRAMUS MARITIMUS NIGRESCENS*, 85); OREGON ZOO (PYGMY RABBIT, *BRACHYLAGUS IDAHOENSIS*, 86-87); MISSISSIPPI MUSEUM OF NATURAL SCIENCE (GOPHER TORTOISE, *GOPHERUS POLYPHEMUS*, 91); U.S. FISH AND WILDLIFE SERVICE (ALABAMA BEACH MOUSE, *PEROMYSCUS POLIIONOTUS AMMOBATES*, 92); PHOENIX ZOO (CALIFORNIA CONDOR, *GYMNOGYPS CALIFORNIANUS*, 94-95); ST. LOUIS ZOO (AMERICAN BURYING BEETLE, *NICROPHORUS AMERICANUS*, 96-97); NEW YORK STATE ZOO (WOODLAND CARIBOU, *RANGIFER TARANDUS CARIBOU*, 98); AUDUBON CENTER FOR RESEARCH OF ENDANGERED SPECIES, NEW ORLEANS (WHOOPIING CRANE, *GRUS AMERICANA*, 99); SEDGWICK COUNTY ZOO, WICHITA, KANSAS (GRIZZLY BEAR, *URSUS ARCTOS HORRIBILIS*, 100-101); ZOO ATLANTA (BOG TURTLE, *CLEMmys MUHLENBERGII*, 102-103); WILD CANID SURVIVAL AND RESEARCH CENTER, EUREKA, MISSOURI (MEXICAN GRAY WOLF, *CANIS LUPUS BAILEYI*, 103); U.S. FISH AND WILDLIFE SERVICE (ST. ANDREW BEACH MOUSE, *PEROMYSCUS POLIIONOTUS PENINSULARIS*, 104-105)



6,000

ESTIMATES RANGE FROM 3,500 TO 6,000

ST. ANDREW BEACH MOUSE

# 1,359 POINTS OF LIFE

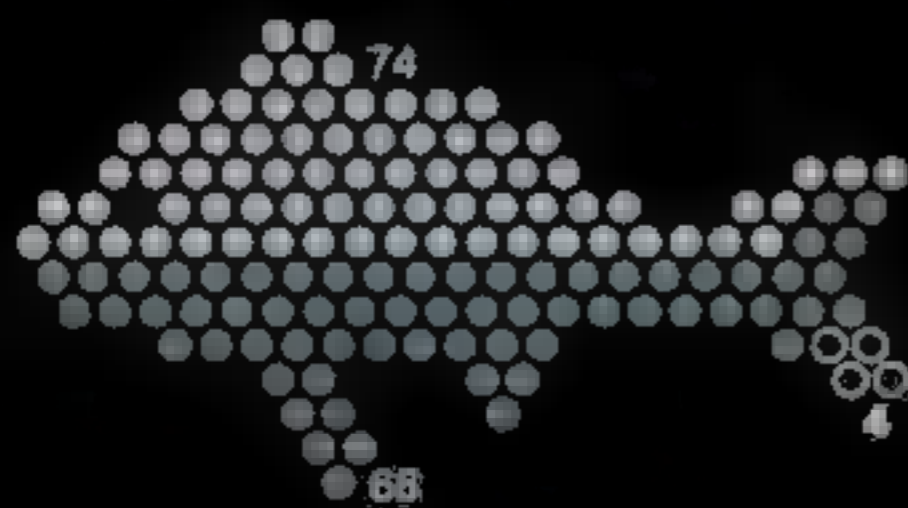
Each solid dot in these icons stands for a species protected by the ESA as endangered (at risk of extinction) or threatened (likely to become endangered). Nearly 300 more animals and plants have been identified as candidates. For the bald eagle and 13 other species, the protection of the 1973 act raised their numbers enough to remove them from the list. For others, attempts to save their habitat came too late: The dusky seaside sparrow, the blue pike, and seven other animals left the list because they no longer exist.

## ANIMALS ● Endangered ● Threatened ○ Extinct

139



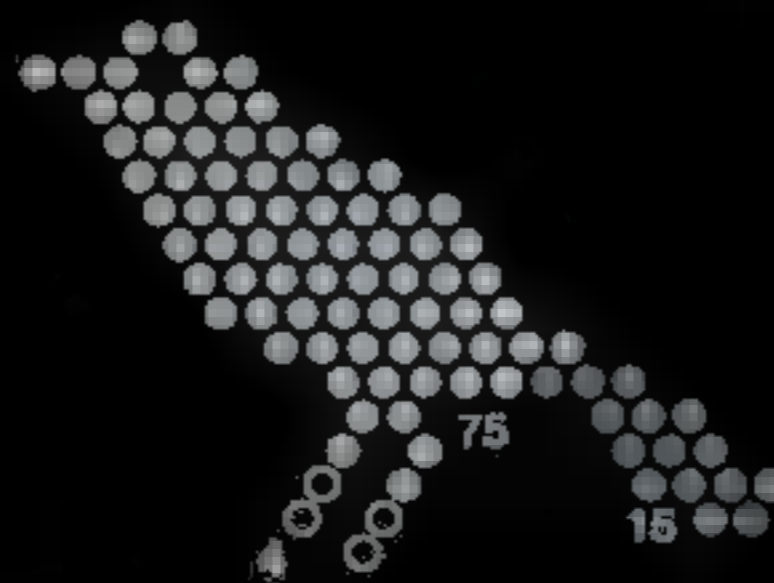
Fishes



90



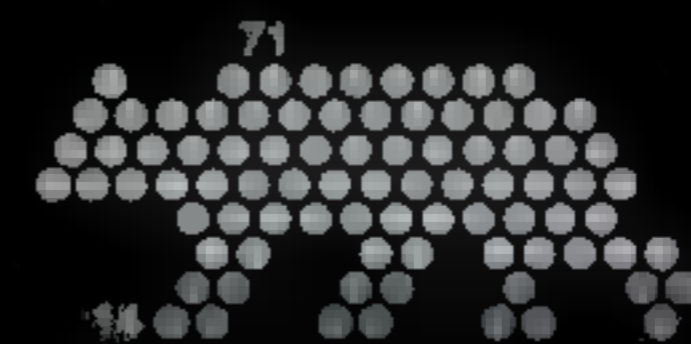
Birds



83



Mammals



37



Reptiles



57



Insects



24



Crustaceans and corals



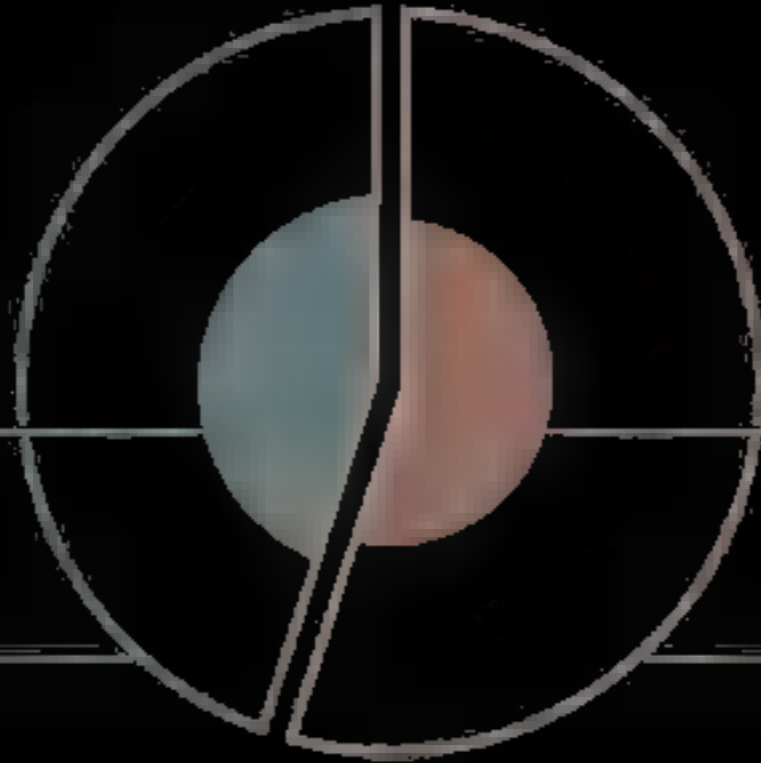
## U.S. SPECIES PROTECTED BY THE ESA

### ANIMALS

613

Threatened  
163

Endangered  
450



### PLANTS

746

Threatened  
146

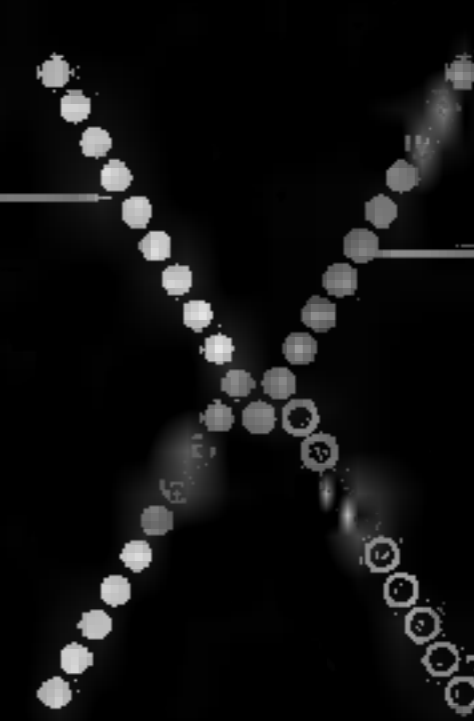
Endangered  
600

## U.S. SPECIES DELISTED

Due to  
recovery  
14

Due to  
incorrect  
data  
16

Due to  
Extinction  
9



75



Snails

70



Clams



24



Amphibians

12



Arachnids



### PLANTS

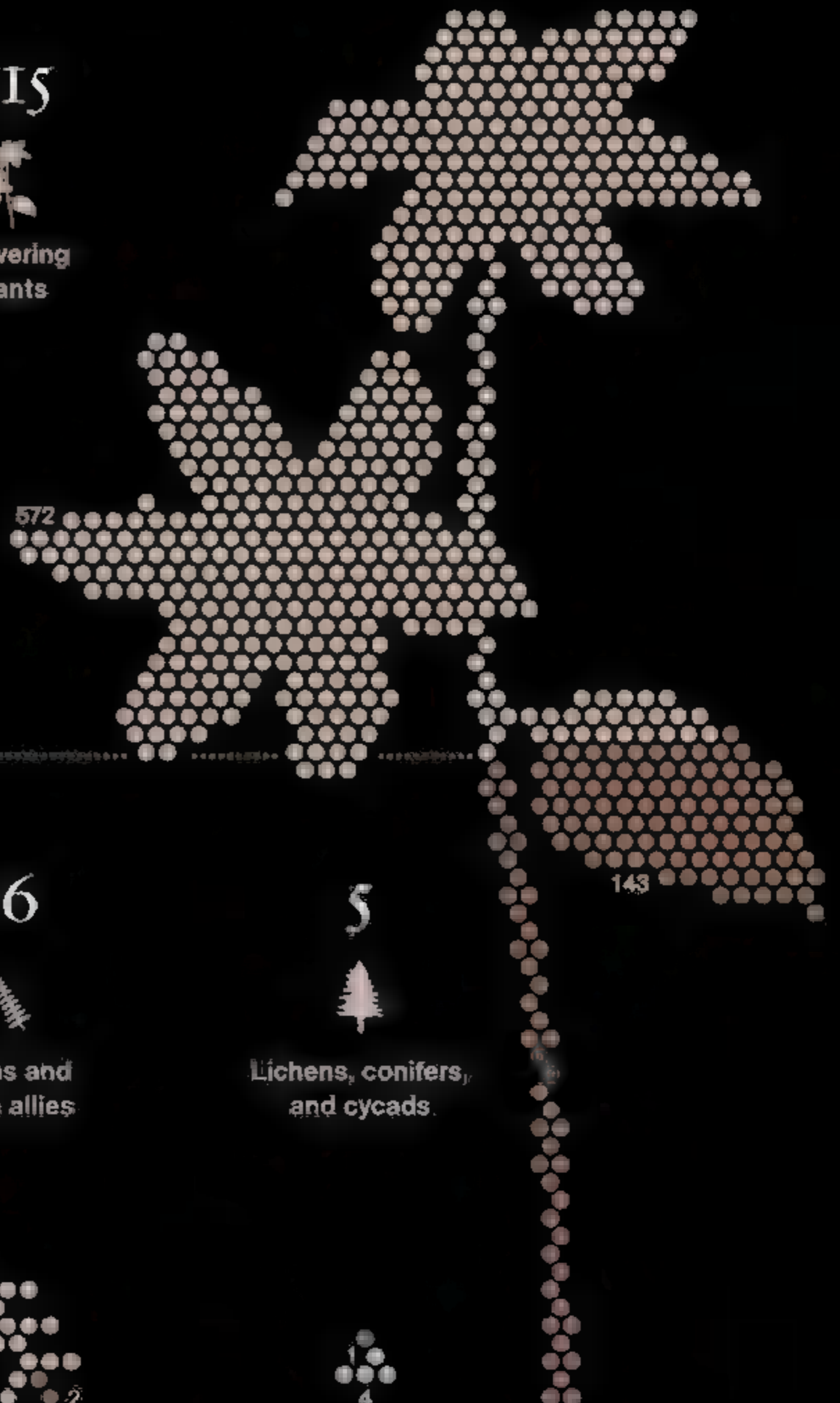
● Endangered

● Threatened

715



Flowering  
plants



26



Ferns and  
fern allies



5



Lichens, conifers,  
and cycads.



IT WAS AN OUTLANSING IDEA: TO CROSS A WHOLE NEW CONTINENT  
ACROSS THE ARCTIC OCEAN AND FIND THE NORTH POLE. ADMIRAL THE ROYAL NAVY, THOMAS  
MORDELL DID NOT BELIEVE IT WAS POSSIBLE. BUT A LITTLE LATER, A DANISH-  
NORWEGIAN SCIENTIST, ROYALTY OF THE DANISH ROYALTY, ROYALTY,  
TO CROSS THE NORTH POLE HAD SOME IDEAS.

FRUITFUL JOURNALS 1893-1896

# 1,000 Days in the Ice

Driven by sails and a steam engine, with a full crew of men and dogs, the ship sailed across the Arctic Ocean.  
Nansen's ship was named Fram, which means "Forward" in Norwegian.









Wool and fur shielded crewmen from the cold when duty called them on deck or onto the ice. Nansen's many accomplishments included photography. In October 1894, when he made this picture, temperatures averaged 8.6° below zero F.

[ BY HAMPTON SIDES ]

OUT IN THE COLD FJORD, on a spit of rocky land just a short ferry ride from the city center, Oslo has created a kind of national cemetery for famous ships. It's a Norwegian thing—what other country would build public crypts around its most beloved boats and enshrine them for the ages?

Out here on the Bygdøy Peninsula, visitors can spend days rambling through splendid museums that house ancient Viking longships, 19th-century fishing vessels, even Thor Heyerdahl's famed balsa wood raft, the *Kon-Tiki*.

But the most striking of Oslo's nautical temples is a pointy glass-and-metal structure that rises from the waterline in the shape of an enormous letter A. Inside, basking in the filtered light, sleeps a sturdy wooden schooner, built in 1892, called the *Fram*.

*Fram* (which means "forward") is perhaps the most famous ship in Norway's long seafaring history, and an icon of polar exploration. Nothing about this fat-bellied ark would begin to suggest the grueling odysseys it has endured. The story of the *Fram* is a modern Norse saga, a story of unimaginable hardship and intelligent striving that is closely tied to Norwegian national identity. The boat itself is an engineering marvel—its reinforced hull having withstood three years gripped by Arctic ice. True to its assertive, full-frontal name, *Fram* bored farther into the frozen latitudes than any vessel had before.

The prime mover behind the *Fram*, the brilliant and moody scientist-explorer who commissioned its construction and led its insanely dangerous maiden voyage into the polar mists, remains a national patriarch. His name is Fridtjof Nansen, and although today he is not as

well-known outside Norway as other marquee polar adventurers—Peary, Scott, and Amundsen—he should be. For Nansen was quite simply the father of modern polar exploration; all others were, in a very real sense, his acolytes.

Nansen was a strapping blond man, fair complected, with a frosty stare and a truculent face that seemed slightly at odds with the refinements of his intellect. Nansen stood apart from the quixotic glory hounds who characterized much of polar exploration's golden age. Call him a Renaissance Viking: He was a gifted writer, a sought-after lecturer, a first-rate zoologist, and a prominent statesman. Fluent in at least five languages, adroit with a camera, he made beautiful maps and illustrations, kept up a voluminous scientific correspondence, and brought an element of cerebral precision to all his explorations. A contemporary German scientist said of Nansen that he "knew how to handle the microscope as well as the ice axe and skis," and his scientific achievements were notable, including a groundbreaking paper on the nature of the central nervous system.

In 1888 Nansen led the first traverse of Greenland—with typical understatement, he called it a "ski tour"—but he missed the last boat home, forcing him to stay the winter hunting seals, learning to kayak, and living with Greenlanders. This experience formed the basis for his acclaimed account, *The First Crossing of Greenland*, published in 1890, and a lively ethnology, *Eskimo Life*. Following his Greenland adventures, he became a leading proselytizer for the sport

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*Hampton Sides explored the life and times of frontiersman Kit Carson in Blood and Thunder, one of Time magazine's ten best books of 2006.*



July 12, 1894: Nansen takes a reading of deep Arctic Ocean water temperature as part of the expedition's scientific work. Astronomical, meteorological, and oceanographic data were consistently collected.

of skiing. At Oslo's Holmenkollen Ski Museum, Nansen is depicted as a twin-planked deity in furs, a founding father of Norway's national sport.

FOR ALL OF NANSEN'S protean accomplishments, it was the harrowing journey of the *Fram* between 1893 and 1896 that gave his life story real drama. The expedition was predicated on an idea so outlandish that the leading polar authorities of the day, including the Royal Geographical Society, considered it suicidal. Nansen deliberately set out to become locked in the Arctic—or, as he put it, to “give ourselves up to the ice.”

Nansen sought to improve upon the voyage of an earlier polar exploration that had ended in disaster. In 1879 the American ship U.S.S. *Jeannette* became locked in the ice pack above Siberia. It drifted in the Arctic for 21 months, but was eventually crushed by the pressure, and sank on June 13, 1881. Although the crew made a valiant sprint for Siberia, more than half the 33 men on the expedition perished. However, three years later, artifacts from the *Jeannette* were found

washed up on the coast of Greenland after having drifted thousands of miles in the ice.

Reading about the *Jeannette* artifacts, Nansen wondered if the strong east-to-west current over the Arctic could be ridden to the North Pole—or at least close. And so an idea was hatched. It was an unorthodox notion, says Nansen biographer Roland Huntford, “to take note of the forces of nature, and try to work with them and not against them.”

The trick, of course, was to build a boat far tougher than the *Jeannette*, and in 1891 Nansen hired a brilliant Norwegian naval architect of Scottish descent named Colin Archer to do just that. Archer's design featured a curiously rounded hull that lacked a pronounced keel, and wells that allowed the rudder and propeller to be hauled up to safety in the event of crushing ice. The hold of the ship was braced with mighty timbers. To keep the explorers warm, Nansen insulated his vessel with thick felt, reindeer hair, cork shavings, and tar. To fight off the perpetual blackness of the polar night, a windmill was

installed to run electric arc lamps. Belowdecks were a cozy saloon decorated with carved dragon's heads and a library that Nansen stocked with some 600 carefully chosen volumes.

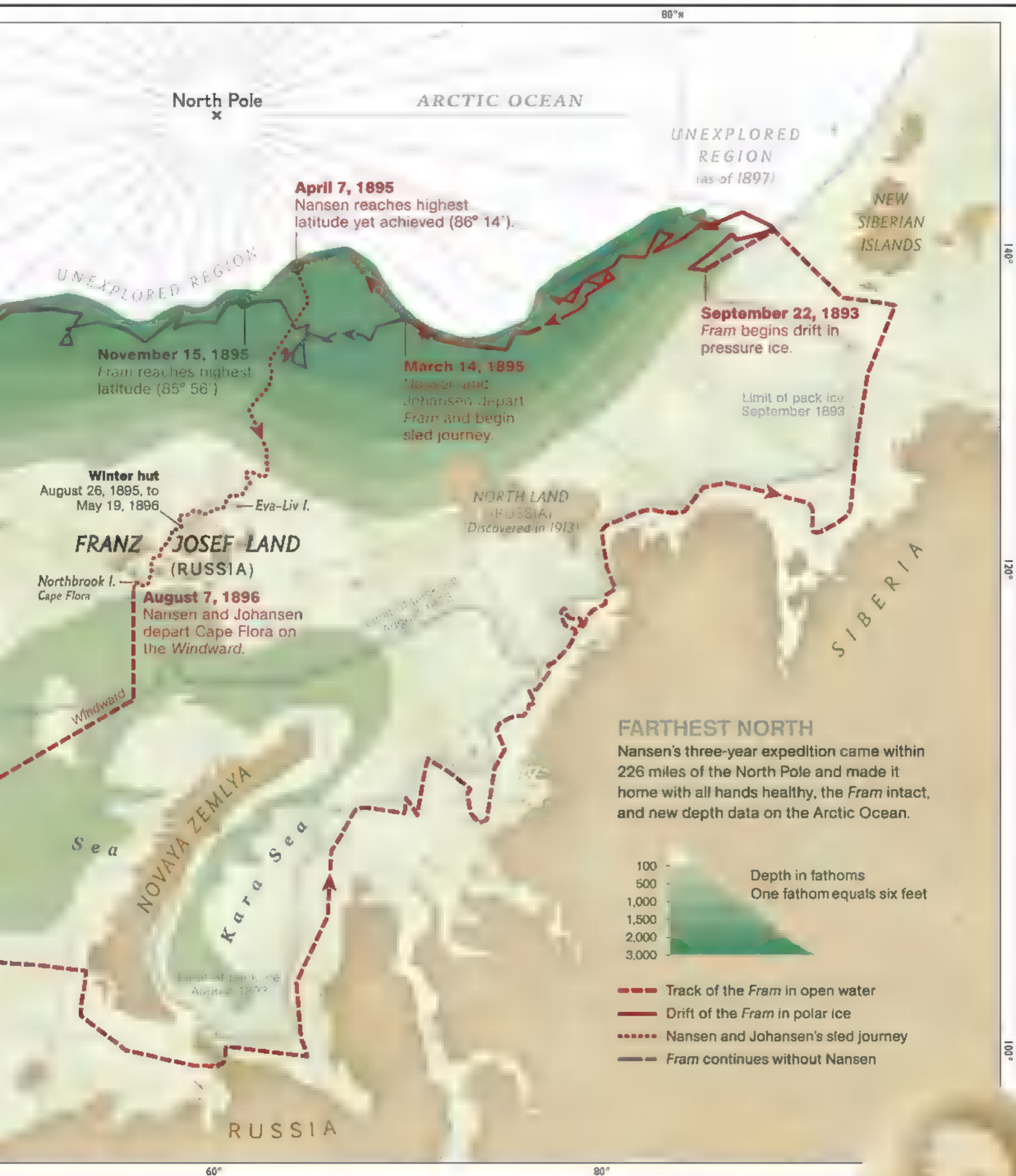
Nansen pronounced the vessel fit, and with thousands of well-wishers lining the Oslo harbor, his wife, Eva, christened the ship *Fram*. With a crew of 13 and provisions for five years, Nansen left Oslo in the summer of 1893, bound for the New Siberian Islands.

As expected, the *Fram* became locked fast in the ice in September. The pressure was intense, and the constant churning and scraping of the ice made ghastly sounds. "A deafening noise began, and the whole ship shook," Nansen wrote. "The noise steadily grows till it is like all the pipes of an organ." The ice, he wrote two days later, "is trying its very utmost to grind the *Fram* into powder." But the *Fram* easily withstood all this frightful squeezing and simply rose up, unharmed, from the depths of the ice. Over time Nansen came to "laugh at the ice; we are living as it were in an impregnable castle."

The *Fram* continued to ride the floes toward the Pole at the creaky pace of a few miles a day. Despite several mishaps—including a polar bear attack that ended with one crewman bitten and two dogs dead—the first two years of the journey were oddly easy. The men ate well in the bright, warm saloon—where an automatic organ played through the long Arctic nights and the electric lamps, Nansen wrote, "acted on our spirits like a draught of good wine." The men published their own newspaper, organized ski outings on the ice for exercise, and took endless soundings and other measurements. Boredom was a constant companion—one crewman cursed "the monastic life we lead in this dead zone"—but Nansen's men did not suffer. "I myself," he wrote, "have certainly never lived a more sybaritic life."

EARLY IN THE SECOND YEAR, however, it became apparent that *Fram* would not reach the Pole. To achieve his goal, Nansen would have to get out on the ice with sleds and dogs and make a dash for it. He selected a companion, Hjalmar





Nansen (right) garnered financial support for the *Fram* expedition from the Norwegian Parliament and other donors, including King Oscar II. He was already a national hero for leading the first expedition across Greenland, on skis, in 1888.





II 29

March 14, 1895: Nansen and Johansen (second and seventh from left) prepare to leave the *Fram* with three sleds, 28 dogs, and three Norwegian flags. Their goal: the North Pole.



Johansen, and in March of 1895, after two false starts, they left the comfort of the *Fram*. A cannon volley boomed as the two skiers, dragging three sleds, carrying two kayaks, and accompanied by 28 dogs, headed north. Nansen and Johansen soon ran into trouble—impossible terrain, equipment failures, fast-shifting floes that canceled out their progress. As their provisions dwindled, they began to butcher the weakest dogs to feed the others. By April they had traveled as far north as they could go— $86^{\circ} 14'$  N. Although they were still 226 miles shy of the Pole, they had ventured farther north than any human ever had. It was the largest single advance in nearly 400 years of Arctic exploration.

Nansen had promised Eva he would make it back alive, and that was far more important to him than risking death—and immortality—at the Pole. “You are thinking of me,” he had written her in his diary one night. “Your thoughts fly northwards in the great desolation. They do not know where to look for me.”

And so, prudently, Nansen turned the expedition around. The two men aimed not for the *Fram*, which had drifted out of reach anyway, but for the distant archipelago of Franz Josef Land, some 600 miles to the south. Their desperate journey over the floes must surely rank as one of the most miserable and arduous polar slogs ever attempted. Over the weeks and months, they killed off their remaining dogs (cutting their throats to save on ammunition), and at one particularly low point were forced to eat a porridge made of canine blood. “If I say that it was good, I lie,” Johansen wrote. “But it went down, and that is the main thing.”

Through the summer of 1895 Nansen and Johansen searched in vain for Franz Josef Land. “For a quarter of a year we have been wandering in this desert of ice,” Nansen despaired, “and here we are still.” Traveling sometimes by skis, sometimes on foot, sometimes in kayaks, they negotiated endless mazes of rafted ice intersected by slushy leads. Nansen admitted that he and Johansen had “no prospect for the moment to get on, impassable packed ice in every direction, rapidly diminishing provisions, and now, too,

nothing to be caught or shot... I lie awake at night by the hour racking my brain to find a way out of our difficulties."

Finally, on August 6, the two men reached an island—the first land on which they had stood for two years—and their fortunes turned. Hunting polar bear and walrus, they soon had fresh meat aplenty and regained their strength. Threading south through the icy archipelago, they realized by August 26 that they would have to spend another dismal Arctic winter far from home. Using a broken sled runner as a pick, Nansen and Johansen built an improvised lair. There they stayed for the next nine months, sharing the same greasy sleeping bag and subsisting on polar bear broth and bear meat fried in walrus blubber. Trapped in such harsh circumstances, they kept their sanity remarkably intact. "We didn't quarrel," Johansen would say later. "The only thing was that I have a bad habit of snoring... and Nansen used to kick me in the back." As Nansen wrote in his diary, "Johansen is asleep, and making the hut resound. I am glad his mother cannot see him now... so black and grimy and ragged as he is."

As the spring thaws came, Nansen and Johansen ventured out of their hovel. They wound south through the archipelago by ski and kayak. When a walrus upended Nansen's kayak, they put in at Northbrook Island to dry out. There they began to prepare for a dangerous journey across the open water to Spitsbergen, where they nursed an overly sanguine hope of being rescued by a Norwegian whaling or sealing vessel. But then on June 17, Nansen thought he heard a familiar sound coming from somewhere over the frozen wastes: a dog barking. He took off alone on skis over the jagged terrain to hunt it down. Nansen wrote: "Suddenly I thought I heard a shout from a human... How my heart beat, and the blood rushed to my brain... I hallooed with all the strength of my lungs." There in the distance, sure enough, was another human being. Nansen approached the figure, and soon the two men enjoyed a remarkable Stanley-Livingstone moment.

"Aren't you Nansen?" the man said in English

as he studied the greasy, soot-blackened wretch before him.

"Yes, I am. By Jove! I am glad to see you!"

"You have made a good trip of it," the man told Nansen, "and I am awfully glad to be the first person to congratulate you on your return."

Nansen's rescuer was an accomplished British explorer named Frederick George Jackson who, as it happened, had met Nansen four years earlier in London. Jackson had sailed his ship, *Windward*, to Franz Josef Land preparatory to his own attempt on the Pole. The explorer was not looking for Nansen, exactly, but he knew that the Norwegian might be in the vicinity.

Still, the odds were against their encounter on this desolate island, and if Jackson had not appeared when he did, Nansen and Johansen in all likelihood would have died. Jackson welcomed the two men into his headquarters hut, where they waited for the *Windward*—sent home the year before for supplies—to speed them home.

WHEN NANSEN AND JOHANSEN returned to Norway in the summer of 1896, they might as well have been returning from the dark side of the moon. Their hero's welcome was made all the more sweet a week later by the happy news that the *Fram*, under the command of Captain Otto Sverdrup, had broken free of the Arctic ice and returned safely the same month.

Never mind that Nansen had not quite attained his goal of reaching the Earth's apogee. He had gotten close, and done it with style and grace and at a time when his countrymen, still under Swedish rule, hungered for a defining hero. Although luck had smiled on his expedition, it was a testament to his foresight and good judgment that not a single crewman had died.

Aside from proving the theory about a polar current, Nansen had made an important discovery about the Arctic: It was an extremely deep sea capped by an ever shifting ice pack—and almost completely devoid of landmasses. The Arctic was, in other words, an ocean.

Nansen became a celebrity the world over, the obsession of swooning ladies, and the toast of dignitaries as varied as Jules Verne and U.S.





Nansen and Johansen, who came closer to the North Pole than any previous explorers, approach the end of their 16-month homeward odyssey. The Arctic, Nansen wrote, demands "all the vigor and elasticity of the soul."

President William McKinley. There were Nansen sardines, Nansen songs, even a Nansen brand of aquavit. Within months he embarked on an extended victory tour to promote *Farthest North*, his haunting account of the odyssey.

One of the many admirable quirks of Nansen's personality, rare for an explorer, was that he knew when to quit. Sensing that his adventuring days were over, Nansen left the Pole-bagging business to Peary, Scott, and fellow Norwegian Amundsen (who, in fact, sailed the *Fram* to Antarctica and used it to launch his historic first journey to the South Pole). Nansen himself forged ahead into completely new fields: oceanography, meteorology, diplomacy. In 1906, a year after Norway achieved independence from Sweden, he became his country's first ambassador to the United Kingdom. After the death of Eva, Nansen squired an impressive succession of international beauties while pursuing a career as a humanitarian. Named a high commissioner for the League of Nations, he helped repatriate prisoners of war and resolve refugee

crises in Turkey and Russia following World War I—hard, peripatetic work that earned him the Nobel Peace Prize in 1922.

Nansen died of a heart attack in 1930 on the balcony of his castle-like house in Lysaker, on Oslo's outskirts, where his ashes are now buried beneath a simple gravestone on the south lawn. He was 69. Today the house, called Polhøgda, is an institute (devoted mainly to the politics of energy and the environment) and a small museum. Up in Nansen's office on the top floor of the tower, one can still find his exploration-age artifacts much as he left them: moldering charts and maps, a pair of Inuit "sunglasses" made of wood with slits as lenses, and a half-rotten polar bear rug spread on the creaky wooden floor. From here one can look out through thick woods toward the cold fjord where the *Fram* was launched and where she now rests in her splendid tomb—not his ship, but Norway's. His desk chair is turned toward the window, facing the only direction Dr. Fridtjof Nansen ever knew—forward. □





POLAR SAGA PART TWO 2007

# Chasing Nansen's Ghost

Two adventurers set out across the Arctic in the footsteps of Norway's pioneering polar explorer.

**Surprise visit:** A young polar bear eyes the unfamiliar sight of a tent on a remote Russian archipelago. When he came closer, **Børge Ousland** and **Thomas Ulrich** scared him off with pepper spray and gunshots in the air.



BY PETER MILLER

PHOTOGRAPHS BY BØRGE OUSLAND AND THOMAS ULRICH

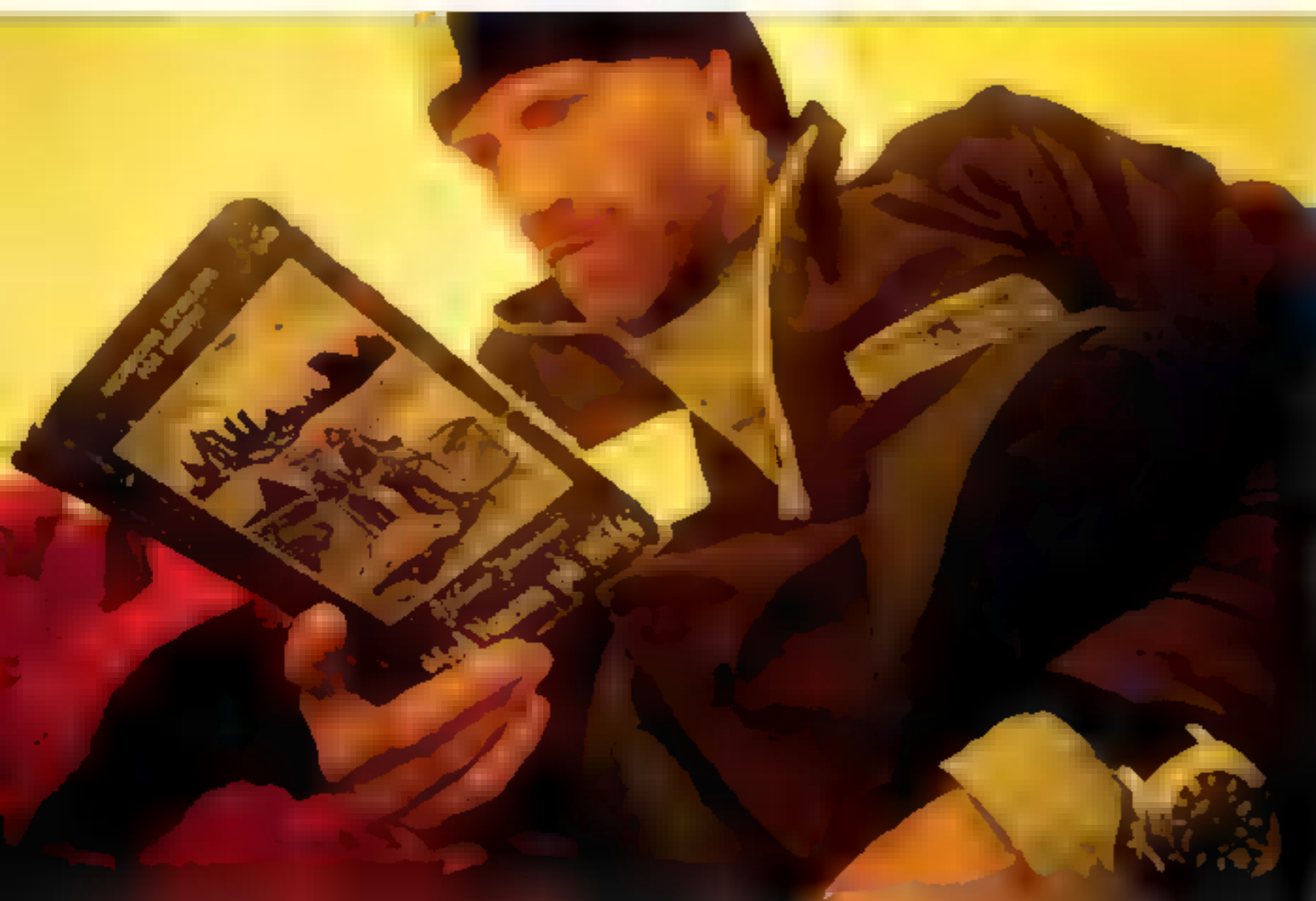
**THOMAS ULRICH SAW IT FIRST.** It was pure white, like a long, smooth cloud on the horizon with a single dark stripe. Shadows passing over the stripe gave it away. The shadows were moving—they were clouds—but the stripe wasn't.

"I think I see land," he said to Børge Ousland, with whom he had spent the past six weeks chasing the memory of two famous explorers across the Arctic. Beginning at the North Pole, the pair had skied 600 miles to this spot off the northern coast of Franz Josef Land, the remote Siberian archipelago where Fridtjof Nansen and Hjalmar Johansen had sought refuge after their own attempt to reach the Pole in 1895.

Like many Norwegian boys, Ousland was raised on bedtime stories about Nansen's exploits. Years later these tales inspired him to make the

first unsupported solo ski trek to the Pole, one of 14 visits as a professional adventurer and guide. Now he and Ulrich, a mountaineer and photographer, were following the same harrowing route Nansen and Johansen had taken 112 years before—something no one else had done.

"We had Nansen's book with us, so we knew we were experiencing many of the same things," Ulrich said. "Just like them, we had skis and kayaks, but," Ousland added, "we used parasails instead of dogs to help us go faster. And, of course, we had communication and navigation



equipment, while they didn't know for sure where they were. Their old map wasn't correct at all."

The land Ulrich had spotted was the distant coast of Eva-Liv Island, named by Nansen after his wife and daughter. But just because Ulrich and Ousland could see the island didn't mean they could reach it. When Nansen and Johansen first glimpsed Eva-Liv, they figured it would take them only a day or two to get there. In the end it took 13, and they barely made it to land.

In June 2007 Ulrich and Ousland faced the same obstacles. The smooth sea ice they'd raced over for days, pulling their rugged plastic kayaks filled with food and gear, had given way to a chaos of icy rubble that looked "as if some giant had hurled down enormous blocks pell-mell," as Nansen described the same scene. Even worse, the whole jumble was drifting northwest, away from Eva-Liv, one floe grinding against another as currents shoved them from below.

With no choice but to forge ahead, the adventurers took their chances in the drifting ice. Still nearly ten miles from land, they jumped from floe to floe, pulling their heavy kayaks

behind them with 40-foot ropes. It was exhausting and nerve-racking. Ousland had already fallen through the ice, weeks earlier, sinking to his waist in the frigid water. Now Ulrich was having flashbacks to a terrifying experience in 2006, when a storm had trapped him on a disintegrating floe off Siberia's Cape Arkticheskiy (see *National Geographic*, January 2007). Finding himself again at the mercy of unstable ice, he said, "I have to tell you, I was scared."

At night they struggled to sleep as the ice shifted beneath them, "like someone kicking you in the back," Ousland said. The strange thing was the silence. In winter, sea ice makes a terrible racket as it cracks and grinds together, but in the mild spring weather, approaching 32°F, floes as thick as three feet crushed together soundlessly. At four o'clock one morning, Ulrich

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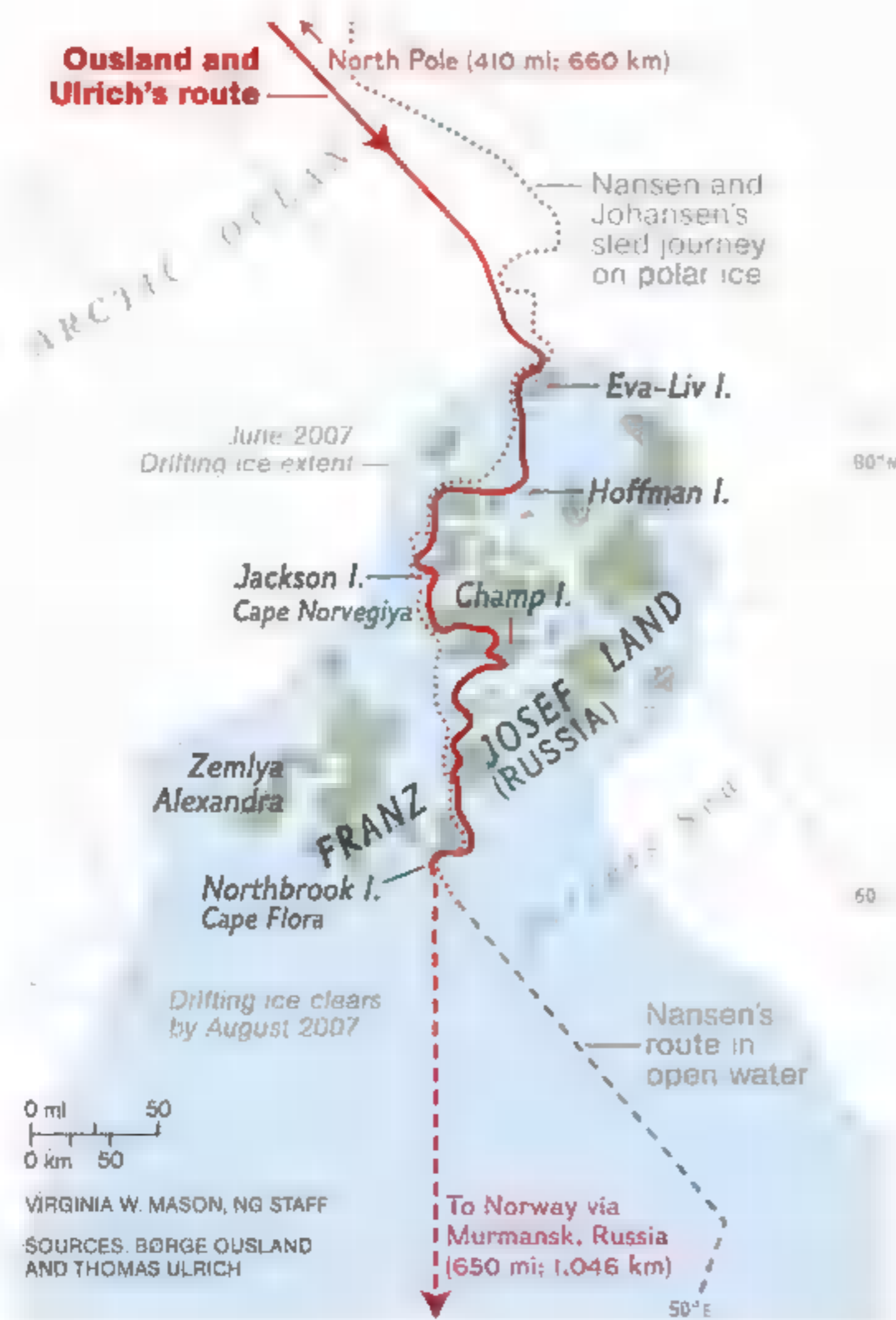
*Peter Miller is a senior editor for the magazine.*

*In 1994 and 1995 Børge Ousland became the first to make unsupported solo treks to both the North and South Poles. In 2003 Thomas Ulrich teamed with him to cross Patagonia's Southern Ice Field.*

Top, left to right: Leaving the North Pole behind, Ousland pulls a kayak over rough ice using his skis as extra poles. To speed the 600-mile journey to Franz Josef Land, he and Ulrich sometimes hooked themselves to ski sails. Ousland's copy of *With Nansen at 86° 14'* was the one his father read to him as a boy. Using a kayak as a bridge, Ulrich crawls over thin ice.







woke Ousland to tell him they were drifting away from the coast at about half a mile an hour, according to their GPS device. When they opened the tent, they saw that a huge channel of black water had opened up a hundred yards away.

At that moment they decided to push as hard as possible to reach land. "We agreed not to stop until we got there," Ousland said, "because if we didn't make it to the island today, we wouldn't reach Eva-Liv at all." Heading southeast, they trudged and paddled through heavy fog until they reached a solid ice edge. They'd been on the go for more than 24 hours. Ulrich checked the GPS device for drift. There was none. This ice was firmly attached to land. They had made it.

For the next eight weeks they followed Nansen and Johansen's trail southwest through the archipelago, moving from island to island. Once a Soviet military zone and still largely off-limits to outsiders, Franz Josef Land remains virtually as unspoiled as it was during Nansen's day.

At Cape Norvegiya on Jackson Island, Ousland and Ulrich found the ruins of the miserable stone hut with a walrus-hide roof where the earlier





explorers had wintered over, hunting polar bear and walrus for food. Nansen had picked up crucial skills from Inuit villagers on Greenland, where he had spent the winter of 1888-89. When he and Johansen ran out of fuel for their stove, they used blubber lamps to cook. “I’m surprised they didn’t just shoot themselves,” Ulrich said, looking at the low circle of stones from the cramped shelter. “The only reason they survived,” Ousland said, “was that they refused to give up.”

By the time Ousland and Ulrich reached Cape Flora on Northbrook Island, where Nansen and Johansen were rescued by British explorer Frederick George Jackson, they too were eager to make their departure. A friend from Oslo had agreed to pick them up by sailboat but had been delayed by several weeks. “It was a very peaceful place with a small lake, the perfect place to wait three weeks,” Ulrich said. “The other islands were just rocks and stones and ice, but Cape Flora was green, with moss and flowers.” The only other residents were thousands of seabirds nesting on cliffs and a hungry polar bear and cub, stranded by the lack of sea ice—a consequence of recent

climate change. Night after night the bears returned to camp to try their luck, tripping the last of the flares set up to scare them off. In the end the men had to shoo the bears away by dousing them with pepper spray, shooting rifles in the air, banging on pots and pans, and screaming at the top of their lungs.

“We chased them right into the water,” Ousland said. “After that we reached an understanding.”

On August 13, as promised, the ketch *Athene* appeared off the coast of Cape Flora, and Ousland and Ulrich paddled their kayaks out to meet their ride back to Norway. After 15 weeks in the far north, the time had come to follow Nansen’s ghost home.

“Nansen was way ahead of his time in how he thought about the Arctic and how to travel in it,” Ousland said. “For us it was like a holiday compared to Nansen,” Ulrich added. “We knew what we had in front of us. He didn’t even know where he was and how far he had to go.” □

■ **Society Grant** This expedition was funded in part by your National Geographic Society membership.

Top, left to right: In the northern part of the archipelago, Ulrich paddles past the face of a glacier. Later, on a southern island, a mother bear and cub try to push into camp. An abandoned Soviet military hut on Hoffman Island feels “too spooky” for the adventurers’ use. After a three-month journey, Ousland smiles as a friend’s sailboat arrives to carry him and Ulrich home.







**By Elisabeth Bumiller**  
**Photographs by Christopher Morris**



The President of the United States is one of the world's most public figures, yet the power and tradition of the office veil his life in ■ tightly controlled, highly protected enclave (above, in Benin) that few outsiders ever see.

# INSIDE THE PRESIDENCY





**THE PRESIDENT PREPARES TO EXIT** Cadillac One on the airport tarmac in Accra, concluding a state visit to Ghana. The Secret Service divulges few details about the custom-built limousine that travels the world with the Chief Executive, but the armored car is rumored to weigh some 10,000 pounds and carry its own oxygen supply to protect against poison gas attacks.







**KEEPING THE BOSS ON SCHEDULE**, the President's "body man" squints through ■ peephole into the Oval Office, preparing to break up ■ meeting. Jared Weinstein's title is Special Assistant to the President. Valet, confidant, mind reader, the 29-year-old rises at 4 a.m. and lives at the Chief Executive's elbow, ready with ■ pen, an iPod, or the name of the President's next visitor.

# HISTORY ALWAYS MAKES A SHARP TURN IN WASHINGTON WHEN A NEW

American President takes the oath of office, and so it will once again on January 20, 2009. There will be new Cabinet members, a new Congress, a new foreign policy, a new style in the East Wing, new embarrassing relatives (if the past is any guide), and new first friends.

But many other things in the private world of the President of the United States will stay remarkably the same. The maids on the permanent White House housekeeping staff will make the presidential bed, just as they always have. The kitchen staff will still peel potatoes and scramble eggs. The gardeners will have planted 3,500 tulip bulbs to bloom in the Rose Garden in the spring.

The permanent care and feeding of the President of the United States is an industry staffed by hundreds of people, largely supported by taxpayers, and little understood beyond the gates of 1600 Pennsylvania Avenue. First families move in and out—“They get a four- or eight-year lease,” says Gary Walters, former chief usher of the Executive Mansion. But the staff, customs, and mechanics surrounding the world’s most powerful chief executive endure, often for generations.

Walters knows this well. As a deputy manager and then manager of the most famous address

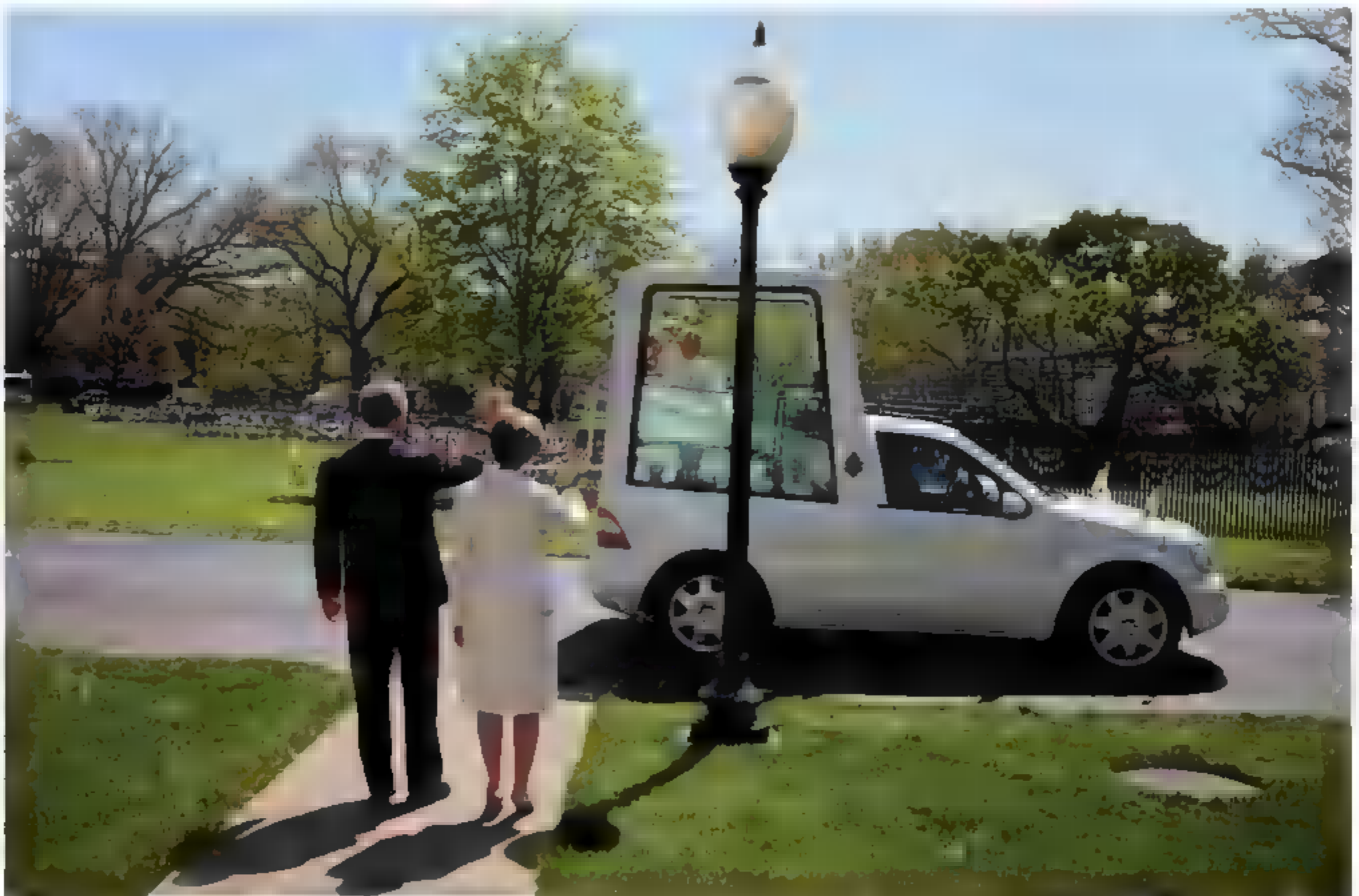
in the U.S. for 31 years, from Gerald Ford to the second President Bush, Walters spanned six presidencies and crises both global and domestic until his retirement in 2007. He ran a house with a 90-member residence staff of butlers, maids, chefs, maître d’s, elevator operators, florists, curators, carpenters, electricians, and plumbers. In some ways it was like running the world’s most exclusive hotel, except that Walters was in charge of a building with four major and often conflicting functions: home, office, grand museum, ultimate event site. Incredibly, the White House has welcomed up to 30,000 guests in a single week.

Walters, an Army veteran and a former officer in the old Executive Protective Service (now known as the Secret Service Uniformed Division), brought military precision and the utmost discretion to a job that was never 9 to 5. His worst times, he recalls, were when one first family moved out, typically around 10 a.m. on January 20, and the other moved in—by 4 p.m. the same day.

Walters’s goal was to have the departing family’s possessions out and the new socks in dresser drawers, personal furniture arranged, pictures hung, family photos displayed, favorite snacks in the kitchen—all in that six-hour time frame.



**EVERY ARRIVAL AND DEPARTURE** is scheduled, ordered, observed. Seen from the window of the presidential helicopter, *Marine One*, a crowd gathers to watch the President lift off the South Lawn (above). Generally, the greensward behind the White House is off-limits for staff and press. "It is the first family's backyard," says former chief usher Gary Walters, a refuge that offers the President and his wife room to bid farewell to Pope Benedict XVI (below).





**IN THE SIT ROOM** the President prepares for a videoconference with Iraq's prime minister. Only staffers with the highest clearances are allowed in the White House Situation Room, a high-tech command post where experts brief the President on national security issues from looming hurricanes to terror threats. Even those who fly on *Air Force One* rarely see the President's quarters (below, at right). Only Secret Service and select stewards routinely pass those doors.



There is no chance to get a head start, since the new President does not officially take office until January 20 at noon, two hours after his moving van pulls up under escort in the White House driveway as the outgoing President leaves for the Capitol. To make the deadline, Walters would deploy the entire 90-member staff at once, divided into teams with specific tasks. Months of planning included repeat verbal dry runs. (No such rehearsals took place before Richard Nixon's early departure, however. Word went out that the First Lady had made a request through the usher's office for packing boxes. "That's how we knew," said Betty C. Monkman, a former White House curator.)

Some transitions were especially rocky. Bill Clinton stayed in the Oval Office until 4 a.m. on January 20, 2001. "Then he had his desk that had to be cleaned out," Walters recalls. He had to wait until the President went to bed before he could swoop in and help Clinton's staff clear out the office to make way for George W. Bush.

But once things settle down, "the White House is first and foremost a family home," Walters says. "It is the responsibility of the residence staff to change to the needs of every family, and not pigeonhole the family to the White House."

To ensure such comfort, Walters would begin questioning the First-Lady-to-be after the election in November, as soon as the outgoing President had invited the new one to visit. What rooms would you like to use for your bedrooms? What time do you want to get up in the morning? What kind of toothpaste should be in the bathroom? What snacks would you prefer stocked in the pantry?

Bush 43 said pretzels, which got him into trouble in 2002, when he choked on one while watching a football game in his White House bedroom, lost consciousness, hit the floor, then came to, with only the presidential dogs as witnesses. Bush's father requested easier to swallow Texas Blue Bell ice cream. He did not, however, request pork rinds, despite making a regular-guy show of nibbling them in public. "It was totally bogus," Walters says. "He didn't eat them."

The second Bush also liked to keep a stainless

steel water dish at the foot of the South Portico's curved granite staircase, and Dale Haney, the superintendent of the White House grounds, could be seen moonlighting as the walker of the presidential terriers, Barney and Miss Beazley. Chelsea Clinton had her friends over for pizza in the State Dining Room. Susan Ford hosted her junior prom in the East Room. In the Reagan Administration, known publicly for its old Hollywood glamour, the President and First Lady liked their private, just-the-two-of-them dinners served on trays in front of the television.

**So what's for dinner?** First Ladies and Presidents generally haven't cooked at the White House, although they have a second-floor kitchen in the family quarters, separate from the main kitchen on the mansion's ground level. The Clintons liked to use their kitchen for post-party glasses of champagne and raided its refrigerator for leftovers. But most families have simply selected a weekly menu from choices offered by the White House chef. State dinners, barbecues for Congress, and holiday receptions for the diplomatic corps are paid for by taxpayers, but the President is billed for all food consumed by his family and his personal guests. In the first months of a new administration, sticker shock is routine.

"I can't remember anybody not complaining," Walters says, recalling in particular Rosalynn Carter's astonishment at the size of the bills. "Mrs. Carter came from Georgia. Things were a little cheaper there at the time. But let's face it, you've got world-class chefs. The garnishes they put on foods, the way they dress them up, it's like eating in a restaurant."

Food comes from various Secret Service-approved commercial suppliers, but also from

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*Elisabeth Bumiller is a national affairs correspondent for the New York Times. She covered the White House from 2001 to 2007. Christopher Morris has documented more than 18 foreign conflicts, including the U.S. invasion of Iraq. He covered the presidency of George W. Bush for Time.*





**ESCAPE FROM THE GLARE** of the global spotlight, a grand view of the capital city, and space to relax have made the White House solarium a favorite of every first family since the room was created from an attic during renovations undertaken by Grace Coolidge. "It's less formal, really the only room in the house not filled with antiques," Gary Walters says.



**GHOSTS OF PRESIDENTS PAST** are everywhere in the White House. The principal reception salon, where Pope Benedict shared an 81st-birthday cake with the President and First Lady, has been adorned in blue since Martin Van Buren dictated the color scheme in 1837. Avid bowler Richard Nixon had a single-lane alley installed in the basement in 1969. As with many such White House renovations, private contributors were called upon to foot the bills.





farmers markets and occasionally just the grocery store. Sometimes the White House chef will stop in at a local butcher on the way to work and pick up a last-minute chop for the President's dinner. Wine, always American—the White House stopped serving French wine in the Ford Administration—comes directly from the wineries and includes offerings from Virginia and Idaho as well as California. (White House Francophile customs died hard: Mamie Eisenhower once had her favorite apple brown Betty listed on a state dinner menu as *Betty Brune de Pommes*.)

The first family pays its own dry cleaning bills, although the staff takes care of sending out the clothes to high-end establishments in town. The President's shirts are done in-house, as are all the family's sheets and towels. The President's valet keeps his shoes shined and deals directly with the housekeepers to replace missing buttons. Presidents select their own suits from the closet each day, although staff members have been known to reject presidential ties as too busy for television. "I can't think of any President who had somebody else pick out his clothes," Walters says.

**When the President leaves** the White House, he travels within an enormous, ever secure bubble, whether seated in the armor-plated limousine referred to internally as "the Beast," flying on *Air Force One*, or sleeping in one of the 600 to 800 hotel rooms required for each stop on a foreign trip.

The President's road show includes a caravan of White House staff, State Department officials, Secret Service agents, communications technicians, crews for *Air Force One* and *Marine One* (the presidential helicopter), Department of Defense staff, and press. A big foreign trip typically includes up to 800 people, among them 30 White House staff members, more than a hundred members of the Secret Service, and some 150 representatives of the media—television and radio correspondents, camera crews, sound technicians, print journalists, wire

service reporters, and still photographers.

The group is actually transported in two planes: *Air Force One* for the President, his staff, his Secret Service agents, and a small pool of reporters in the back; and the White House press charter, usually a United 747, for the rest of the media. (Reporters are rotated in and out of the 14 press seats on *Air Force One*, but on either plane, media organizations pay dearly for the seats, typically the price of first-class airfare or more.) The entourage is accompanied by cargo planes that transport the President's limousine and a spare, plus sometimes *Marine One*, to each stop.

The nucleus of the bubble, referred to within the White House as "the package," consists of the President, his senior staff, the Secret Service detail assigned specifically to him, and a small pool of reporters. The package essentially isolates the President from the rest of the bubble and the outside world. Inside the package life is serene; humming outside is the 24/7 infrastructure required to keep the peace.

The head of the road show in the Bush 43 Administration was Joe Hagin, former deputy chief of staff in charge of operations, who believes in striking a balance between protecting the President and allowing him some exposure in public. "You can't lock him in a steel box and move him around," Hagin says. "You have to get him out."

Hagin would begin planning Bush's foreign trips up to a year ahead. Every November or December, he'd sit down with the White House chief of staff and national security adviser to block out what usually amounted to five or six annual presidential trips overseas. Some were built-in, such as the yearly Group of Eight meeting of industrialized nations or the NATO summits, both must-attends for the American President. But others, like Bush's trip to Africa in February 2008, were designed to highlight administration policies and to show the White House flag.

"My geography's not good enough to do it without a map," Hagin says. So with maps unfolded all over the conference table in the national security adviser's office, and with

the *Air Force One* pilots on hand to consult, the group would figure out what stops made geographic sense. There were all-important political considerations as well. Bush 43, who grew increasingly unpopular overseas as his administration progressed, often augmented his European trips with stops in former Soviet-bloc nations like Albania, where he could count on pro-democracy, pro-American crowds to cheer him on.

The White House Communications Agency, or WHCA, builds its own communication system for each destination, and on foreign trips the leader of the free world can push a button on the telephone in his hotel suite and be instantly connected to a direct-dial U.S. system. Bush hasn't carried a personal cell phone for security reasons, but he had access to any number of them while traveling.

One cell is specifically for the presidential limousine, where there is never a problem with background noise. People who have been inside say that the limo is eerily serene, as if the outside world were on mute. The President can see the crowd, but he can't hear it, especially not over the deep rumble of the Beast's big V-8.

*Air Force One* is the President's refuge. He can sleep in his cabin, a suite in the nose of the plane with a shower and two daybeds. Or he can work out; before Bush's knees gave out and he abandoned running, he had a treadmill set up in the *Air Force One* office on foreign trips. The jet's kitchen serves full dinners prepared by military stewards, but they are unlikely to win culinary or nutrition awards. Steak, chicken, and pork chops are normal fare. In June 2002, when Bush was on a trip to Florida to promote dietary and physical fitness, the *Air Force One* lunch menu, printed on gold-edged cards for all passengers, was corned beef sandwich, steak fries, and strawberry cheesecake.

As the President moves with ease from meeting to meeting, an intense choreography churns around him, all outlined in hundreds of pages of briefing books. "We can go to the other side of the world and land precisely to the minute," Hagin says. "But you've got to know what you're

doing. These trips are not for the faint of heart." Only experienced staff members go overseas, and they are expected to know where to stand, what to wear, how to address foreign dignitaries, and when, literally, to run.

**In spite of the briefing** books and the overall efficiency of Hagin and his team, travel foul-ups occasionally occur. In May 2005, only a malfunction in a live hand grenade, tossed into an ebullient crowd of tens of thousands in Tbilisi, Georgia, averted what could have been a lethal attack. In 2004, Bush waded on his own into a group of security agents to pull a Secret Service agent out of a shoving match with the Chilean police. In 2002, the Beast came to such a sudden stop en route to lunch in Beijing with then President Jiang Zemin of China that the wire services reported a blowout, conjuring images of Secret Service agents rummaging through the trunk for a jack. The problem was in fact mechanical, and the President was moved to the spare limo within moments.

Not surprisingly, the President, like everyone else, is happy to get home. Although Ronald Reagan said he often felt captive in the fishbowl of the White House, many other Presidents and their families have loved it there.

And why not? There is, after all, a recently refurbished movie theater, suitable for viewing major Hollywood films sent overnight from the studios. (In the past couple years Bush saw *The Kite Runner* and *The Perfect Game*.) There is a swimming pool, the same one where Gerald Ford spoke to the press in his bathing suit. There is a tennis court, too, and the Children's Garden, a shady spot created by Lady Bird Johnson, its walkway lined with bronzed handprints and footprints of presidential grandchildren.

Most of all, there is a sense of home and history, coupled with the knowledge that a first family, however well cared for and fed, can only pass through. Or as one of the permanent household staff gently reminded Barbara Bush during her time as First Lady: "Presidents come and go. Butlers stay." □



**PROTECTING THE PRESIDENT** abroad requires months of detailed planning and the ability to improvise instantly, says retired Secret Service agent Joseph LaSorsa. Near a presidential stop in Ghana (above), a counterassault-team member scans for threats. Days later agents survey the grounds of a Hungarian airport (below). "Some governments give you a world of support," LaSorsa says. "In other places, if something bad happens, you are like a man on a deserted island."





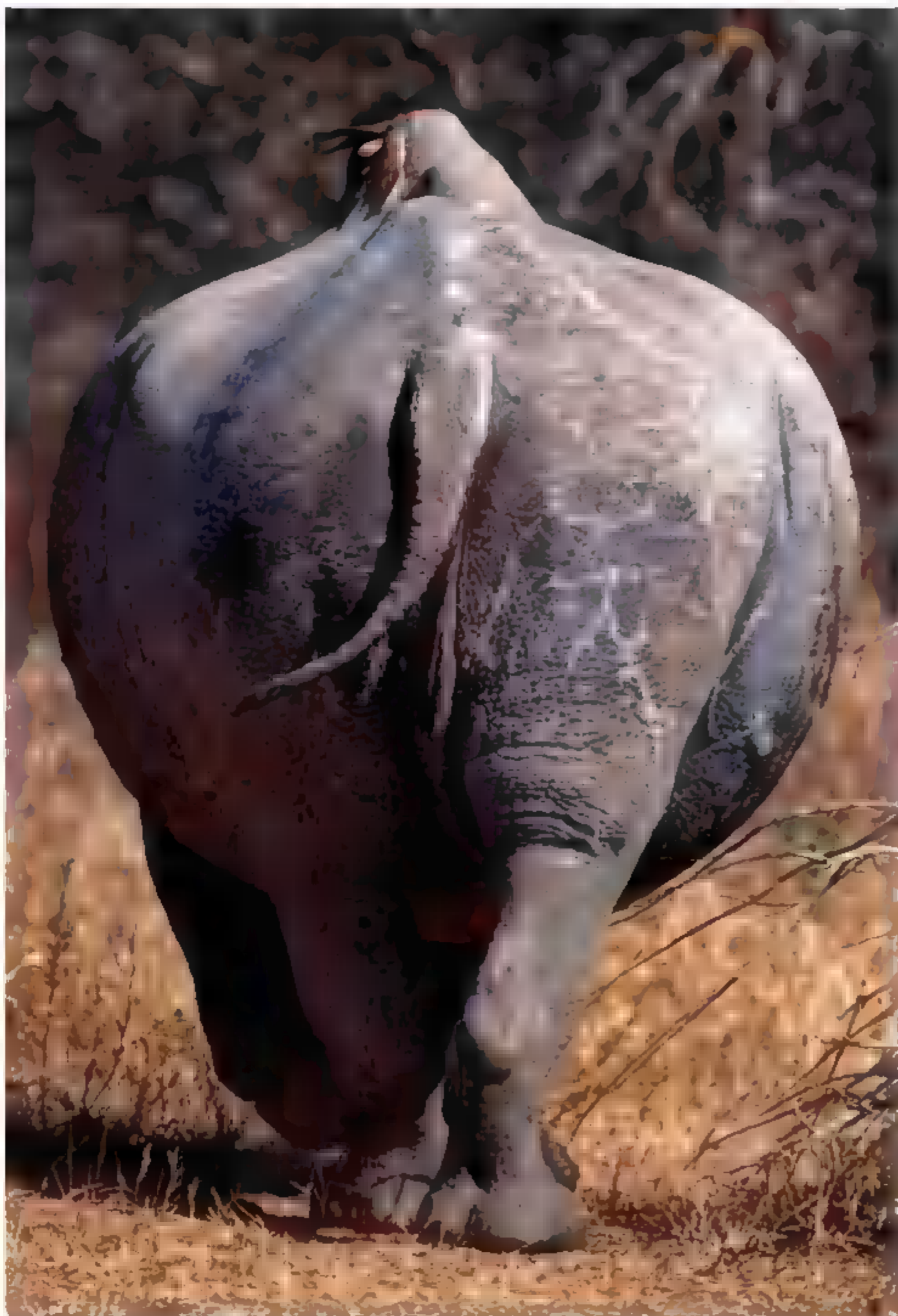


**THE COMMANDER IN CHIEF'S GOLF BAG** stands at Camp David's lone practice hole just in case the President wants to hit a few balls. Dwight Eisenhower named the rustic retreat in Maryland's Catoctin Mountains after his grandson. The Defense Department calls it Naval Support Facility Thurmont: Groundskeepers, carpenters, electricians, even the President's Camp David cooks are all sailors. A handpicked unit of Marines secures the 130-acre compound.





**ROMPING GROUND** for first family pets, the South Lawn (left) lies under a scrim of snow and scattered dog toys. Soon two terriers will follow their master home to Texas, and a new President will move into the White House. As conceived by William Howard Taft, the Oval Office (above) symbolizes a President's role at the center of his administration, personally involved in the people's business. It is an emblem of American democracy, underlined by the orderly succession of its occupants. "Whether you are Republican or Democrat, your fate is tied up with what is done in this room," Harry Truman said in his farewell address. "The President is President of the whole country."



White rhinos aren't white. The name is thought to be a corruption of the Afrikaans word for "wide," referring to lip size.

**A RANGE OF RHINOS**

The southern white (left) has walked away from endangered status. Other rhinos remain in peril.

**Near threatened**

**Southern white** (Africa)

**Endangered**

**Indian** (Asia)

**Critically endangered**

**Javan** (Asia)

**Sumatran** (Asia)

**Black** (Africa)

**Northern white** (Africa)

**Rhino Revival** The African southern white rhinoceros has stepped back from the precipice, reaching a population of 17,500—large enough and genetically diverse enough to survive. The turnaround is stunning. At the end of the 19th century this fearsome yet relatively placid grass-eater, which can grow to more than 5,000 pounds, was nearing extinction, a victim of indiscriminate hunting.

Then in 1895 a remnant population of 40 or fewer rhinos was located. In a long-term project, South Africa set aside a game reserve,

now Hluhluwe-Umfolozi Park, to nurture them. By the 1960s private landowners had also begun building white rhino herds so trophy hunters could take a shot at a few each year; the fee is currently about \$40,000. Making rhino ranching profitable was key to saving the animals, says Michael Knight, head planner for national parks. Another species in South Africa, the aggressive black rhino, lives a solitary life that makes protecting it more of a challenge. Like other rhino species, it is clinging to survival. —Chris Carroll



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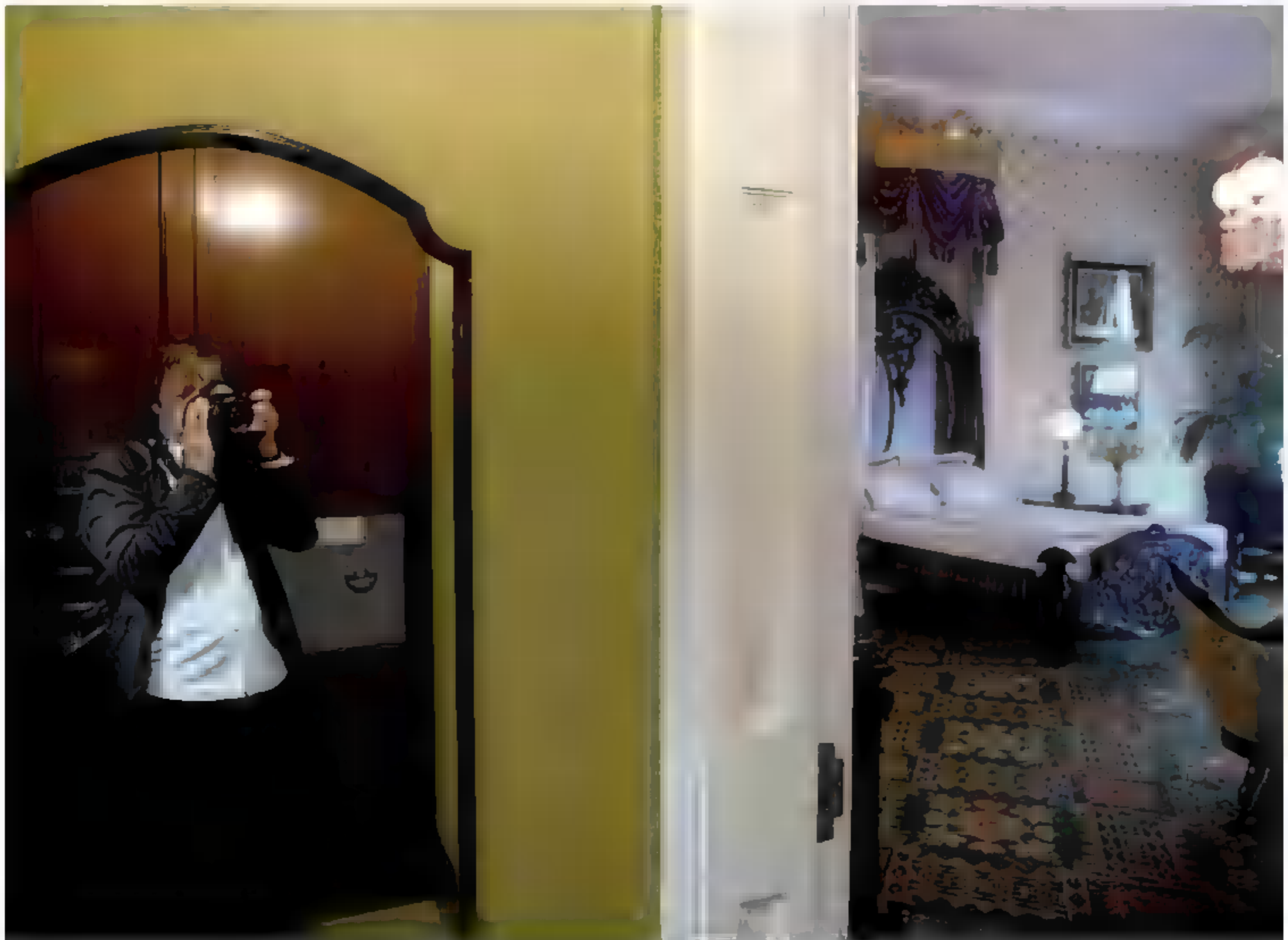
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Christopher Morris stepped into a White House closet (above) for a better angle on the Lincoln Bedroom.

**ON ASSIGNMENT** **Presidency in Focus** Photographer Christopher Morris covered the White House for *Time* from 2001 to 2007. For this month's "Inside the Presidency" story, though, he didn't focus on President George W. Bush. Instead, he told the story of the Presidency by looking at the people and things around him. It was an assignment Morris was well suited to. "I like objects, like the window blinds in the solarium," he says. "That's the view of the President and the First Lady from their private space."

Morris had hoped to photograph the President making himself ■ peanut butter and jelly sandwich in the private kitchen. He didn't get a chance. Otherwise, he had extraordinary access. Journalists rarely ride in the President's helicopter and limo, but Morris did. After months of asking, he was given permission to shoot in the top secret White House Situation Room, at 7 a.m. on his last day of work on the story. He had only about 30 seconds before President Bush was ready to start the meeting. "He doesn't really say anything. He just gives you a look," says Morris. "That's your cue to leave."

The President is known for giving nicknames to everyone around him. He sometimes called Morris "Keith"—Morris shares the fashion sense of Rolling Stones guitarist Keith Richards—but usually just Chris. In return, it was "Mr. President or sir," says Morris. "You don't call him George, that's for sure."



In the New York Federal Reserve Bank's ultrasecure vault, Randy Olson lifts a gold bar. It is, he says, "surprisingly heavy."

**ON ASSIGNMENT Gilt Trips** Burly movers are shifting pallets of gold from one numbered locker to another in the underground vault of the New York Federal Reserve Bank. Conveyor belts help with the load—each brick weighs 28 pounds, and there are hundreds. Randy Olson photographed the wealth as it moved, perhaps from country to country—the Fed wouldn't say. "It's not a daily occurrence," he says. "I was lucky to be there when they were transferring gold."

Olson, who took the pictures for this month's story on the precious metal, was already familiar with gold at its source. In Guyana for ■ May 2002 *Geographic* story on catfish, he witnessed "hydraulicking," blasting dirt into streams with high-powered hoses to wash the gold out. The practice also fills the streams with mud and kills the fish. For a September 2005 story he visited the Democratic Republic of the Congo to photograph Pygmies—and saw their forest being destroyed as new mines were dug. "I've been touching on this over the years," says Olson. "It's nice to actually do the story on gold."

## PEOPLE BEHIND THE STORIES

### ■ Elisabeth Bumiller

On September 10, 2001, Bumiller started work as a White House correspondent for the *New York Times*. Over



the next five years she covered the response to 9/11 and traveled the world with President

Bush. But in writing "Inside the Presidency," Bumiller drew on her experience with the other White House: that permanent cocoon where Chief Executives come and go but butlers stay. "The President," she says, "has a four- or eight-year lease. But the customs surrounding his care and feeding—the meals, the lawn care, the personal bills he's expected to pay—stay remarkably the same."

### ■ Hampton Sides

While writing this issue's "1,000 Days in the Ice," journalist and author Sides traced the life of scientist and



adventurer Fridtjof Nansen, a Nobel Prize-winning Norwegian who helped prove that

the Arctic is an ocean. Sides also located a living link to the golden age of exploration: Nansen's great-grandson Nicolai. "When I first met him," says Sides, "he was out of breath, having just touched down from a skydive. Over an Indian-food dinner he regaled me with tales of his travels to the Amazon, Laos, Alaska. He's also crossed Greenland on skis, twice. Clearly the Nansen adventuring gene lives on."



The President's motorcade drives up to *Air Force One*.

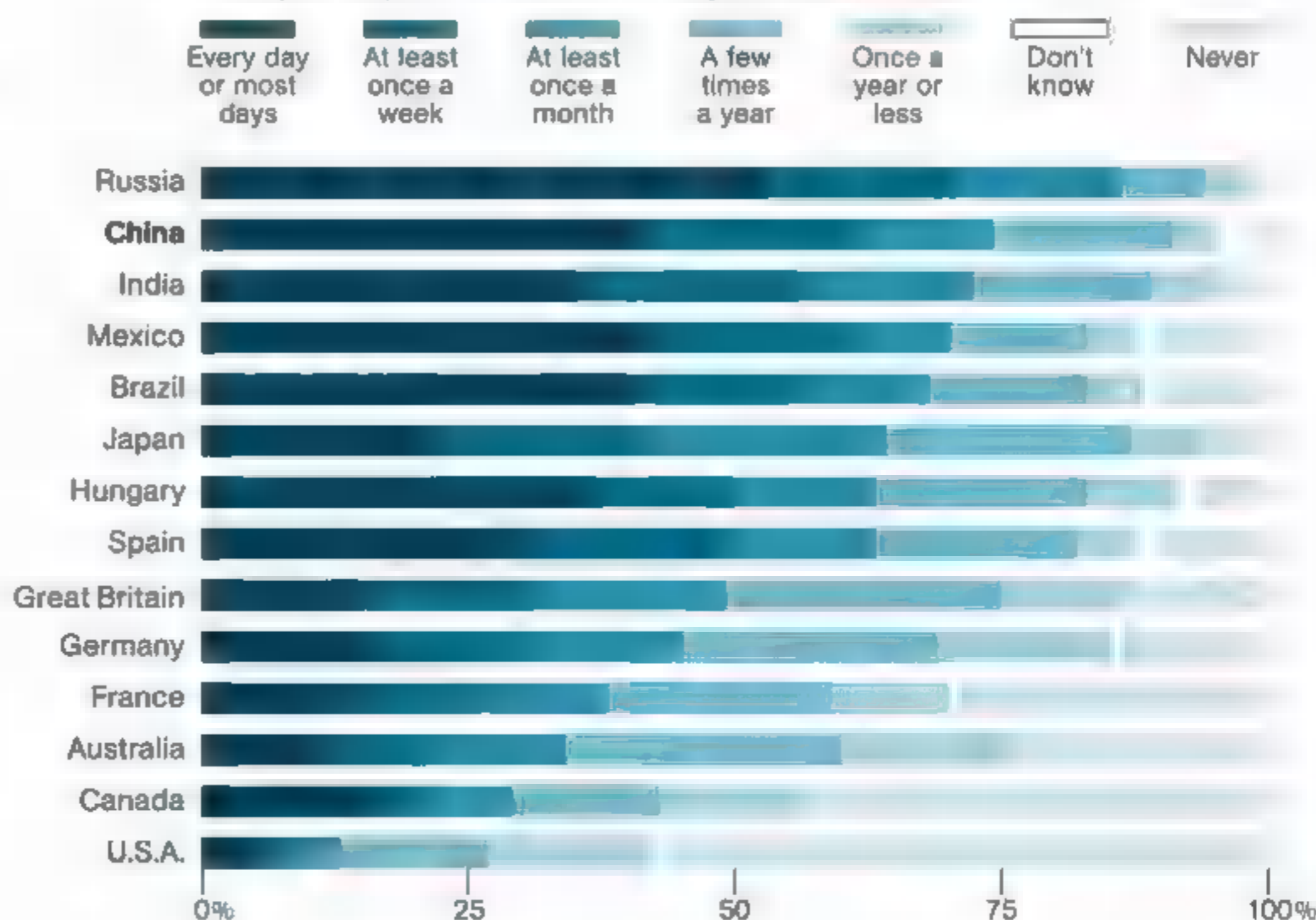
## Hail to the Plane

*Air Force One*: Is it real or is it a clone? In case of emergency, the White House keeps an identical twin of the famous jet. The customized Boeing 747 has a presidential bath, a conference room, and its own staircase for the runway. The National Geographic Channel show *On Board Air Force One* takes a behind-the-scenes look at the plane and its crew. The one-hour special airs January 25 at 9 p.m.

## Green Habits

Today, more than half of China's consumers take public transit weekly (right). Will this change as the country grows wealthier? That's the kind of question National Geographic's Greendex will help answer. The first annual survey, from 2008, asked 1,000 people in each of 14 countries about food, housing, transportation, and shopping to see who made the most environmentally friendly choices. Brazilians and Indians did best; developed countries brought up the rear. Calculate your score at [nationalgeographic.com/greendex](http://nationalgeographic.com/greendex).

### Frequency of Public Transportation Use



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# Amish mantle and miracle invention help home heat bills hit rock bottom

*Miracle heaters being given away free with purchase of real Amish fireplace mantles to announce the invention that help slash heat bills, but Amish craftsmen under strain of winter rush forces household limit of 2*

**Save money: only uses about 8¢ electric an hour; so turn down your thermostat and never be cold again**

By MARK WOODS  
Universal Media Syndicate

(UMS) Everyone hates high heat bills. But we're all sick and tired of simply turning down the thermostat and then being cold.

Well now, the popular HEAT SURGE® miracle heaters are actually being given away free to the general public for the next 7 days starting at precisely 8:00 a.m. today with purchase of mantle.

The only thing readers have to do is call the National Distribution Hotline before the 7-day deadline with their purchase of the handmade Amish Fireplace Mantle. Everyone who does is instantly being awarded the miracle heater absolutely free.

This is all happening to offer the HEAT SURGE Roll-n-Glow® Fireplace which actually rolls from room-to-room so you can turn down your thermostat and take the heat with you anywhere. That way, everyone who gets them first can immediately start saving on their heat bills.

Just in time for winter weather, portable Amish encased fireplaces are being delivered directly to the doors of all those who beat the deadline.

These remarkable fireplaces are being called a miracle because they have what's being called the 'Fireless Flame' patented technology that gives you the peaceful flicker of a real fire but without any flames, fumes, smells, ashes or mess. Everyone is getting them because they require no chimney and no vent. You just plug them in.

The Fireless Flame looks so real it amazes everybody because it has no real fire. So what's the catch? Well, soft spoken Amish craftsmen who take their time hand building the mantles have a process that forces a strict household limit of 2



■ **GENUINE AMISH MANTLES MADE IN THE USA:** Everyone wants to save money on heat bills this winter, so entire Amish communities are working from the crack of dawn to finish. These fine real wood Amish made fireplace mantles are built to last forever. The oak mantle is a real steal at just \$298 because all those who beat the order deadline by calling the National Hotline at 1-800-918-4312 to order the fireplace mantles are actually getting the imported hi-tech Fireless Flame HEAT SURGE miracle heaters for free.

to keep up with orders.

"We can barely keep up ever since we started giving heaters away free. Now that it's really cold outside, everyone's trying to get them. Amish craftsmen are working their fingers to the bone to be sure everyone gets their delivery in time for to save a lot of money," confirms Timothy Milton, National Shipping Director.

"These portable Roll-n-Glow Fireplaces are the latest home decorating sensation. They actually give you a beautifully redecorated room while they quickly heat from wall to wall. It's the best way to dress up every room, stay really warm and slash your heat bills all at the same time," says Josette Holland, Home Makeover Expert.

And here's the best part. Readers who beat the 7-day order deadline are getting their imported hi-tech

miracle heaters free when encased in the Amish built real wood fireplace mantles. The mantles are being handmade in the USA right in the heart of Amish country where they are beautifully hand-rubbed, stained and varnished.

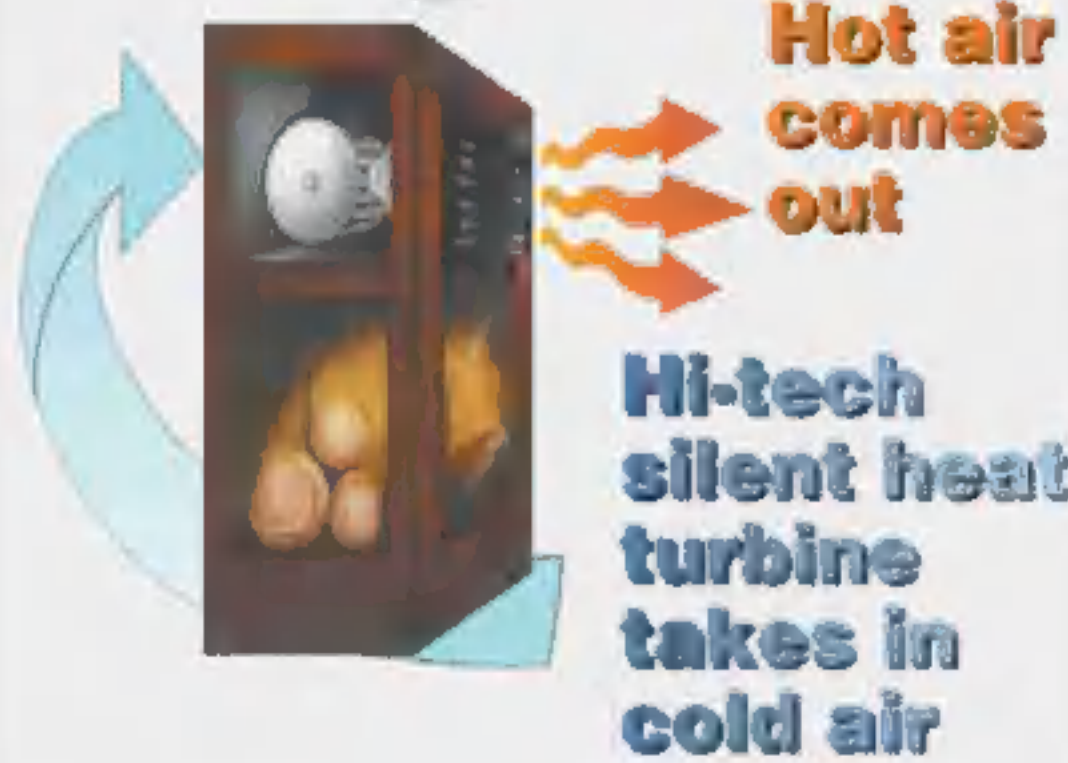
You just can't find custom made Amish mantles like this in the national chain stores. That makes the oak mantle a real steal for just two hundred ninety-eight dollars since the entire cost of the miracle heater is free.

This free giveaway is the best way to slash heating bills and stay warm through the dead of winter. The HEAT SURGE Roll-n-Glow Fireplace gives you zone heating and all the beauty and warmth of ■ built-in fireplace but rolls from room-to-room so it can also save you ■ ton of money on heating bills.

Even people in California and

# HEAT SURGE® Fireless Flame

**How It Works:** The HEAT SURGE miracle heater is a work of engineering genius from the China coast so advanced, you simply plug it into any standard wall outlet. It uses only about 8¢ of electric an hour on the standard setting. Yet, it produces up to an amazing 5,119 BTU's on the high setting. An on board Powerful hi-tech heat turbine silently forces hot air out into the room so you feel the bone soothing heat instantly. It even has certification of Underwriters Laboratories coveted UL listing. It also comes with a limited full year replacement or money back warranty plus a 30-Day Satisfaction Guarantee.



# How to get free heaters

The National Toll Free Hotlines are now open. All those who beat the 7-day order deadline to cover the cost of the Amish made Fireplace Mantle and shipping get the HEAT SURGE miracle heater free.

A strict limit of 2 per household has been imposed. Since some home woodworkers want to build their own mantle piece, they are letting people get the imported miracle heater alone for just \$249. Or, with the Amish made mantle you get the miracle heater free.

Use the map below to locate the weather zone you live in and call the Hotline number for your zone.



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**ON THEIR WAY:** Winter rush orders have turned country roads into pipelines to the big city delivery system. Everybody wants a fireplace that comes fully assembled with a handmade Amish mantle in oak or cherry finish and gets delivered by truck right to your door. All you do is plug it in.

Florida are flocking to get them so they may never have to turn on their furnace all winter. And since it uses only about 8 cents of electric an hour on the standard setting the potential savings are absolutely incredible.

"We are making sure no one gets left out, but you better hurry because entire communities of Amish craftsmen are straining to keep up with demands. For now, we are turning away all dealers in order to let readers have two

per household just as long as they call before the deadline," confirms Milton.

It's a really smart decision to get two right now because for only the next 7 days you get both miracle heaters free. That's like putting five hundred bucks right in your pocket and you can save even more money on your monthly heating bills.

"Everyone's calling to get one but those who really want to save a lot on their heating bills are surprising

the whole family by getting two. So when lines are busy keep trying or log onto [amishfireplaces.com](http://amishfireplaces.com). We promise to get to every call. Then we can have a delivery truck out to your door right away with your beautiful Heat Surge Roll-n-Glow Fireplace," Milton said.

"You'll instantly feel bone soothing heat in any room. You will never have to be cold again," he said. ■

*On the worldwide web:*  
[www.amishfireplaces.com](http://www.amishfireplaces.com)

**Rolls anywhere to throw an instant heat wave with no chimney, no vents, no wood and no smoke**



**EASILY ROLLS ANYWHERE:** This is the portable Roll-n-Glow® Fireplace that easily rolls from bedroom to living room to keep you warm. No vents, no chimney and no tools. Just plug it in.



**SAVES ON BILLS:** Everyone can get low bills and stay warm and cozy. The new Roll-n-Glow Fireplace saves a ton of money and makes your front room look like a million bucks.



**SAFE:** The Fireless Flame looks so real it fools everybody but there is no real fire. That makes the flame safe to the touch. It's where the kids will play and the cat and dog will sleep.



**FREE:** Get this \$249 miracle heater free. It is being given away free to all who beat the 7-day order deadline for your choice of the oak or cherry finish Amish Mantles. The free heater comes already encased.



**Face Time** The third President of the United States was the second carved into the side of South Dakota's Mount Rushmore—and it took sculptor Gutzon Borglum two tries to get Thomas Jefferson right. His first attempt, located to George Washington's right, was ruined by a flaw in the granite. It was blasted off the mountain in 1934. Borglum's next Jefferson (above), on Washington's left, was dedicated in 1936. Much of the carving of Washington, Jefferson, Abraham Lincoln, and Theodore Roosevelt over 14 years of construction did not go as Borglum first planned. The monument's original design called for the Presidents to be finished down to their waists. —Margaret G. Zackowitz

👉 **Flashback Archive** Find all the photos at [ngm.com](https://www.nationalgeographic.com).

PHOTO: RAPID CITY CHAMBER OF COMMERCE, NATIONAL GEOGRAPHIC STOCK

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## Our challenge: Nothing short of reinventing the automobile.

This is how we're doing it: We are going to build the Chevy Volt, the extended-range electric vehicle designed to move over 75% of America's daily commuters without a single drop of gas.\* We will offer the widest variety of hybrids, one for every need. We have clean diesels on the road today and more cars capable of running on E85 ethanol than any other automaker. We are testing the world's largest fleet of hydrogen-powered cars right now.\*\* And we are investing in two biofuel companies that will be capable of turning waste into fuel. In short, we're reinventing the automobile. Sure it's a big challenge. But we're well on our way.



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